

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

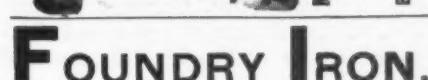
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THE IRON AGE

THURSDAY, MARCH 12, 1903

The Brush Storage Battery Patent Expires.

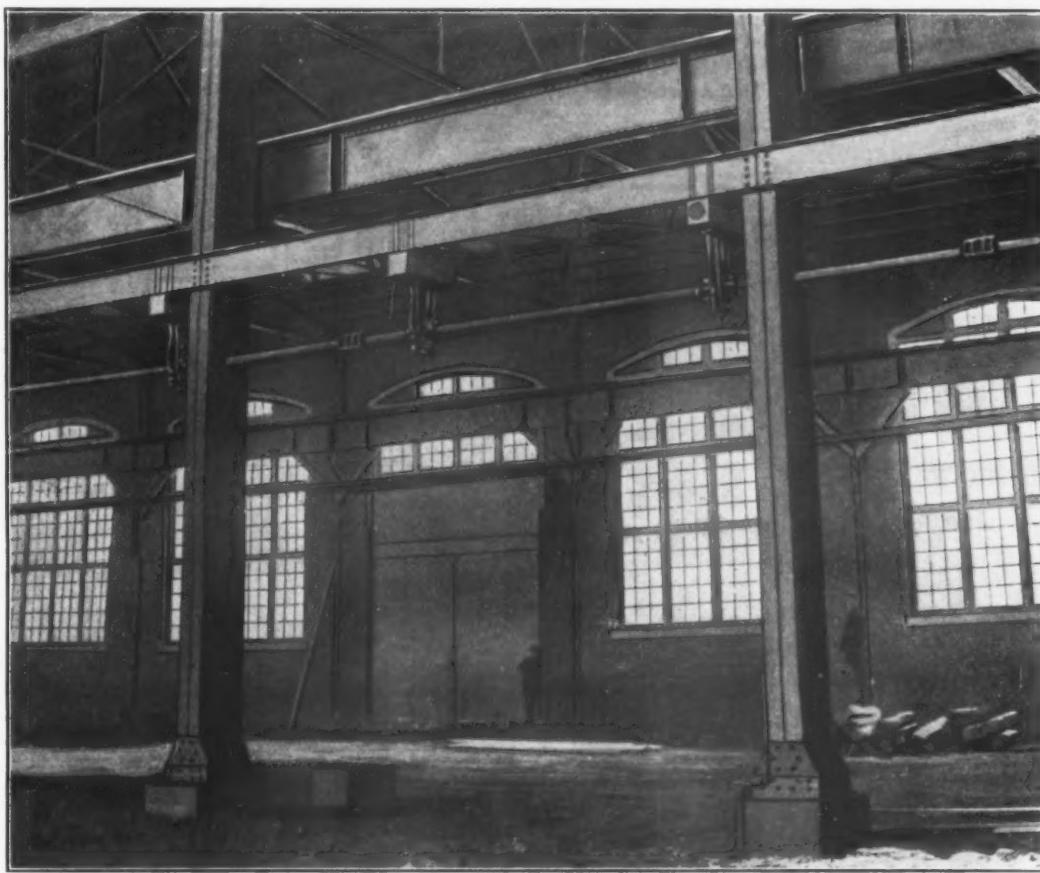
The last barrier in the way of the general manufacture of electric storage batteries was removed on March 3 by the expiration of the Brush patent on storage battery electrodes. The *Electrical Review*, commenting on the fact, says that there may not be a great increase in the number of factories, but the magazine looks for improvement and extension of the use of power batteries.

The electric motor car manufacturers, it says, will profit more than anybody else by the new order of things. Lighter and better batteries for motor cars will appear, and the highly developed products of the Euro-

pean makers can be imported. In this way the prices can be kept reasonable, and the performance of electric motors greatly improved, with a resulting increase in their popularity and an augmenting business for manufacturers, both of machines and of batteries. Slight change is expected to occur in the power station batteries.

New Boiler Shop of the Titusville Iron Company.

What is probably the largest boiler shop in the country has just been completed by the Titusville Iron Company of Titusville, Pa. It measures 421 x 200 feet, and is divided longitudinally into four bays of 50 feet each. In the building, equipment and general arrangement are embodied features by no means common in a shop to be devoted exclusively to boiler making. In the first place,



NEW BOILER SHOP OF THE TITUSVILLE IRON COMPANY.

pean makers can be imported. In this way the prices can be kept reasonable, and the performance of electric motors greatly improved, with a resulting increase in their popularity and an augmenting business for manufacturers, both of machines and of batteries. Slight change is expected to occur in the power station batteries.

The Brush patent, says the *Review*, was one of the most remarkable patents in the history of the electrical art. It covered completely the art of making plates by mechanically applied material, as a paste, powder, or in any other form. There have been repeated assaults on it in the Federal Courts, and enormous sums of money were spent in litigation to have the patent declared invalid, but in every instance it came forth victorious.

"To sum up," concludes the *Review*, "the result of the expiration of the Brush patent will be to improve

ample provision has been made for insuring plenty of light, both through wide windows in all of the side walls and through skylights in the center roof. That the illumination is entirely adequate will be appreciated upon examination of the elevations, Figs. 2, 3 and 4. Heat is provided by a 250 horse-power tubular boiler of the company's own make, placed in a building at the center of one of the long sides of the shop.

Each bay is traversed by a crane, the outside ones being of 5 tons capacity, and those in the center of 15 and 20 tons.

The arrangement of the tools and tracks is shown in Fig. 6. A spur from the railroad enters the Washington street end of the building, where the finished work is kept. At this end are also placed the stock plates and heads and stack work. The tools, as indicated in the plan, are so grouped as to make the work continuous as

far as possible. Tools intended for handling heavy work are served by jib cranes. An admirable method of driving the tools has been adopted. Both individual and shaft drive are used, the nature of the machine and the work it does governing the method in each case. In line with each outside row of columns is a shaft extending about one-third the length of the shop. Each shaft is driven by a gas engine of the company's make located at one end. These two shafts drive all the tools which are operated practically all the time. All the other tools, where the power required makes it feasible, are provided with individual drives.

The method of carrying the shaft hangers is peculiar, and is to be commended for its simplicity, and for the fact that while it is completely out of the way it is so conveniently placed as to permit of the tools being located at either side of the row of columns, as may be most desirable. The method of carrying the shaft will be understood from the half-tone engraving, Fig. 1. The hangers are bolted to the girder uniting the columns, and are so situated as to bring the shaft in the center line of the columns. To permit the passage of the shaft the web of each column is pierced with a hole.

Why American Goods Are Supplanting German Goods.—*Export*, a trade paper, published in Berlin, devoted to extending German foreign trade, devotes a series of articles to studying the methods by which American goods

wise pound foolish" policy, and give their agents decent, fixed salaries, so as to enable them to withstand the "flattering offers of their American competitors," adding: "This is all the more important since American competition in the world's markets will evidently grow keener during the next ten years."

The Merchants' Exchange of Buffalo, N. Y., in conjunction with the Manufacturers' Club and backed by the manufacturing interests of that city, are making special efforts to secure the convention of the National As-

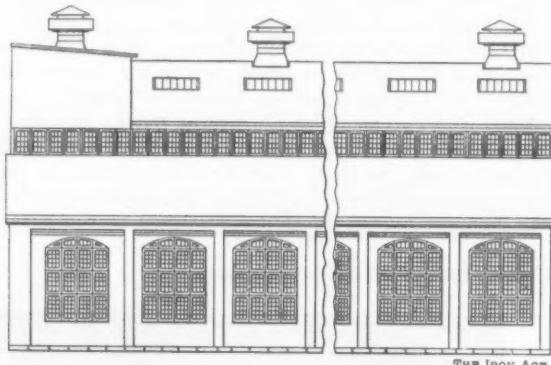


Fig. 4.—Part Side Elevation.

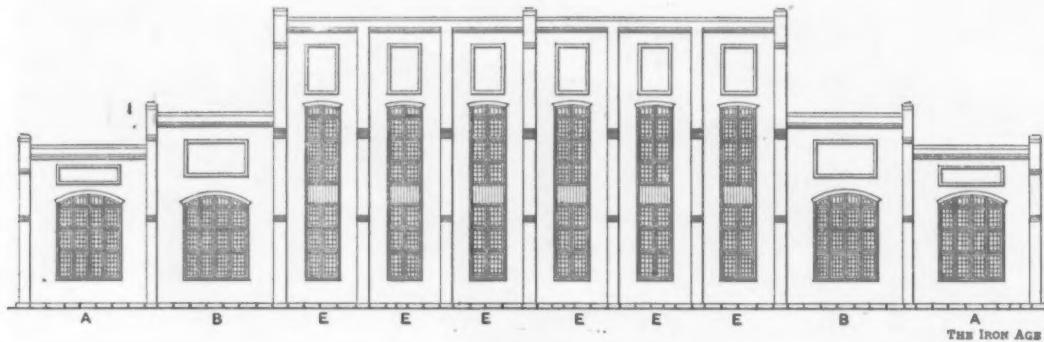


Fig. 2.—West Elevation.

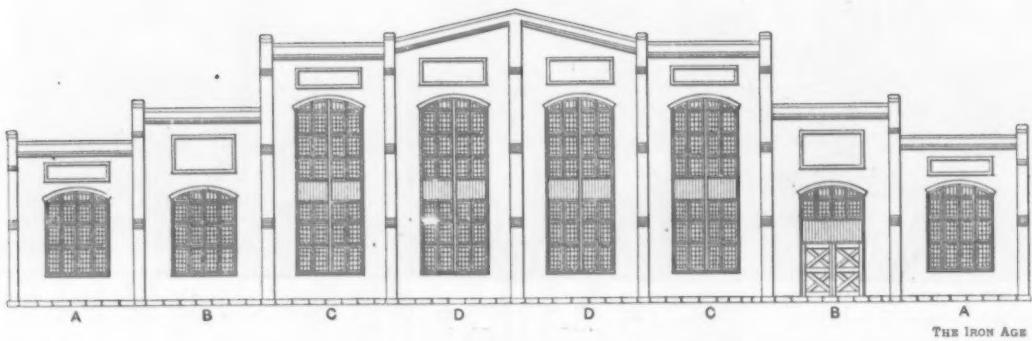


Fig. 3.—East Elevation.

NEW BOILER SHOP OF THE TITUSVILLE IRON COMPANY.

are supplanting German goods in foreign markets. The articles consist largely of letters from Germans living in Mexico, Venezuela, Brazil and Australia. The writers explain that the German houses are being beaten because they are unwilling to guarantee agents fixed salaries, as the Americans do, and also because they depend on sending out catalogues, whereas the Americans keep stocks of goods in established agencies, where buyers are able to purchase after seeing the goods, and therefore prefer to deal with Americans. The German agents, it is added, are largely taking service with American houses, because of the better terms offered them and owing to their handling exclusively American wares. The German manufacturers are urged to abandon their "penny

society of Manufacturers for 1904, and if successful will amply provide for its entertainment in their city, now coming to the front as a manufacturing center, and at nearby Niagara Falls, where the power development has brought and is continuing to bring many immense industries, some of them of novel and interesting character. This year's meeting will be held in New Orleans, beginning April 14 and extending through the 16th. The National Association of Manufacturers has a membership of about 2000, representing every class of industry in the United States. In the eight years of its existence the association has done an educational work of vast importance in the export field, and has been instrumental in aiding our manufacturers to lay the foundations of an enormous export trade.

Industrial Notes from Mexico.

DURANGO, March 3, 1903.—Machinery and apparatus valued at \$4,514,437.06, gold, were imported into Mexico during the first five months of the current fiscal year.

The order for heavy locomotives recently placed by the Interoceanic Railway Company with an English firm is said to have been awarded to the latter in preference to United States manufacturers on account of better terms and lower prices.

The Mexican Central Railway Company, Limited, have ordered from an English company a number of bridges of various lengths.

The Mexican Coal & Coke Company have placed an

order for heavy locomotives recently placed by the Interoceanic Railway Company with an English firm is said to have been awarded to the latter in preference to United States manufacturers on account of better terms and lower prices.

J. J. D.

The Eastern Iron Company.—Some time since the Secaucus Furnace, at Secaucus, N. J., was purchased by an organization formed under the title of the Eastern Iron Company, who also control mines at Gouverneur, N. Y. The officers of the company are: Chase Andrews, president; Frederick Crane, vice-president; S. L. Mershon, secretary, and J. M. Clark, treasurer. The general manager of the company is Albert Trinler, who was for-

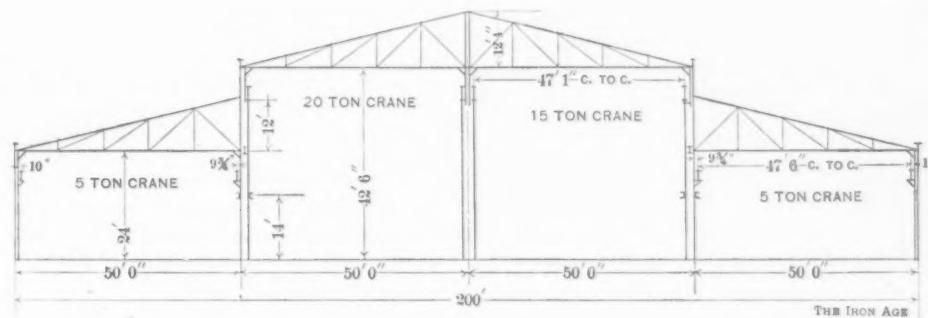


Fig. 5.—Cross Section.

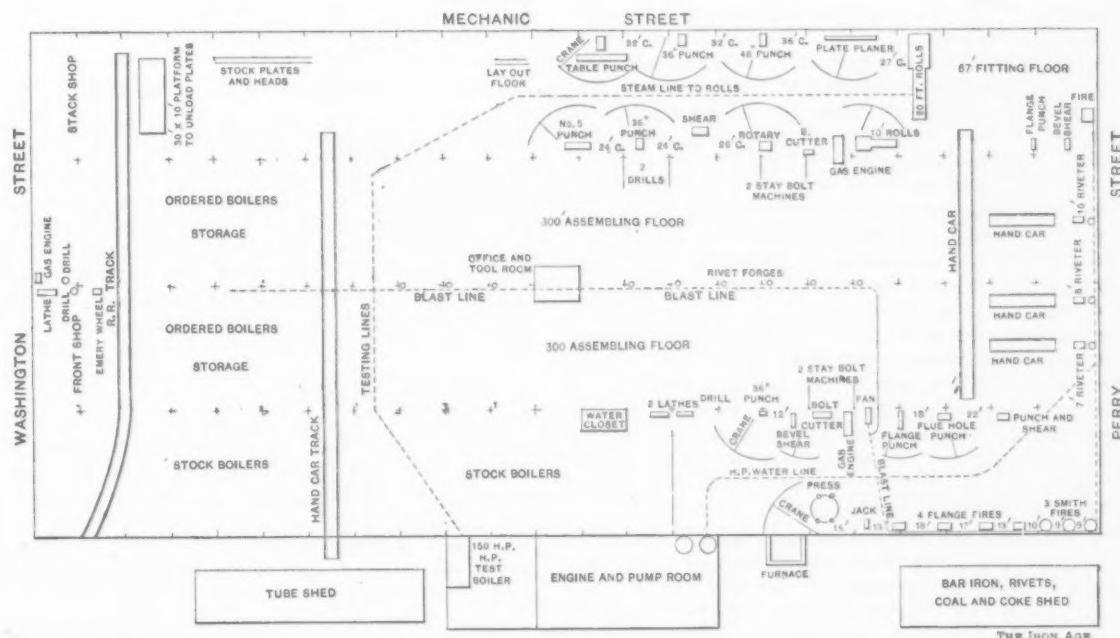


Fig. 6.—Plan.

NEW BOILER SHOP OF THE TITUSVILLE IRON COMPANY.

order with the American Car & Foundry Company for 20 freight cars.

The Mexican Central Railway Company will soon commence active construction work upon their new extension from Gutierrez, a station upon the main line, to Durango. This will cut off about a third of the distance now to be covered to reach the capital from Durango.

A local paper in Monterey has this item relative to the working of the blast furnace just blown in at the works of the Monterey Iron & Steel Company: "In no respect has the iron proved inferior to any, and the operators at the plant declare that the product which is now being piled up to the extent of hundreds of tons is of the best quality. . . . Since the blowing in there have been slight difficulties in the operation of the furnace, but no more than at the inauguration of any similar concern in the United States."

The new glass factory at Monterey is about ready to

merly the manager of the National Steel Company's plant at Sharon, Pa. Improvements are now being carried out at the Secaucus Furnace, and it is expected that it will be ready to blow in about May 1.

The American Tool Works Company.—Recent changes in the personnel of the American Tool Works Company of Cincinnati have placed the management of the business in the following hands: Franklin Alter, president; Henry Luers, secretary and treasurer; J. B. Doan, general manager; A. E. Robinson, general superintendent. The month of February resulted in next to the largest month's business in the history of the company. The plant is exceptionally busy in all departments, and the outlook for the future business is pronounced very bright. Extensive alterations and improvements are now being made, adapted to the company's increasing business. They have just brought out several new tools.

Mechanical Stokers.*

BY EDWIN FITTS, PITTSBURGH, PA.

The greatest loss in hand firing occurs just after the charging of fresh fuel in large quantities and it is due to the fact that there cannot be a sufficient supply of oxygen brought up through the bed of fuel to supply the excessive demand at such times. The smaller each charge of fuel is and the less time elapses between charges, the less are the variations in the quantity of air demanded. This brings us to mechanical stoking and an almost continuous supply of fresh fuel, requiring no variation in the quantity of air supplied, with the added advantage that there is no opening of fire doors with the accompanying loss.

First Stoker Patented in 1841 in England.

As to the history of mechanical stoking we may note that the first to use the idea of progressive burning of coal was James Watt. He distilled the coal on a dead plate at the mouth of the furnace and then pushed the coke back over the grate area by hand. In this way a fairly good combustion can be obtained, but the labor is very excessive. Many variations of this plan were brought out from time to time, but the first mechanical stoker was patented in 1841 by John Juckes, an English inventor. This was of the tread mill type and is in extensive use to-day, having been changed in detail of construction, and is now known as the chain grate stoker. There are a number of different makes of chain grates on the American market, and for fear of being considered biased toward one maker I will describe them as a class.

The term treadmill type comes from the fact that the grates are built like the apron of a treadmill and pass over sprockets at the front and rear of the furnace. The grate surface is horizontal and the grates are moved from front to rear on the top, by power applied to the front sprocket shaft. Immediately at the front of this grate surface is a hopper extending the entire width and having at its back side a plate, which can be raised and lowered to govern the thickness of the bed of fuel. Immediately back of this hopper and extending the entire width of the grates is a fire brick arch. The proportion of the entire grate surface covered by this arch varies in the different makes of chain grates. In the operation the hopper is filled with coal, which is carried back by the movement of the grates and begins to burn as it comes underneath the igniting arch. The bed of fuel continues to move back until it reaches the rear end of the grates, when what is left is dumped over into the ash pit below. The fuel bed is not disturbed in any way during the period of burning.

The Murphy the First American Stoker, 1878.

The first distinctly American invention of a mechanical stoker was the Murphy, brought out by Thos. Murphy of Detroit, Mich., in 1878. Besides being the first American stoker the Murphy was, I believe, the first invention in which a sloping grate surface was used. The sloping grate stokers of to-day can be divided into two classes, the side feed and the front feed. Of the side feed type we have two, the Murphy and the Detroit.

The Murphy stoker consists of two coal magazines, one at each side of the boiler, which form a portion of the boiler walls and extend back a depth depending on the grate area demanded. The bottom of these magazines is a flat plate built up of castings and steel angles in such a way that the top surface where the coal lies is cast iron and directly beneath this is an air duct. Lying on top of this plate, called the coking plate, are inverted rectangular cast iron boxes having racks on their under side at each end. Beneath these boxes is a shaft extending the entire depth of the furnace and having segments of gears which mesh with the racks on the stoker boxes above. As this shaft is rotated through a small arc by means of an arm at the front of the furnace the stoker boxes are moved from side to side on the coking plate. As the box moves toward the center of the setting a charge of coal is pushed out

* From a paper read on March 3, 1903, before the Mechanical Section, Engineers' Society of Western Pennsylvania.

toward the edge of the plate. Resting against the edge of this plate and sloping down to the center of the furnace at an angle of 40 or 45 degrees are the grate bars. Running along the center of the furnace is a heavy cast iron bearing bar, upon which the grates rest at their lower end. Supported by this bearing bar and taking the space between the lower ends of the grates is a hollow cast iron bar, having projections on its outer surface, which is made to rotate and grind the clinker into the ash pit below. The grates are straight casting and are made in pairs. One grate of each pair is stationary and the other is made to rise and fall about 2 inches at its lower end. Forming the inner side of the coal magazine and coming down to within 5 inches of the coking plate is a heavy ribbed casting known as the arch plate. Extending the entire depth of the grate surface and resting on the arch plates at each side is a fire brick arch. This arch is built with an air duct on its upper side, which is connected with the outside of the furnace by means of the passage in the coking plate already mentioned and with the fire space by means of small openings in the cast iron skew backs, on which the arch rests. The object of these passages is to admit hot air above the coal at the point where the volatile matter is driven off. The moving parts of the stoker are all actuated by a small engine standing at one corner and forming part of the stoker itself. This is made to drive a reciprocating bar extending across the front and connection is made to this by removable links. Any one part can be operated independent of all other parts. A distinctive feature of this type of stoker is the large coking space per square foot of grate area. This description covers the Detroit or Morrow furnace in all but one particular. In this stoker the coal is fed to the fire by means of a screw at each side.

Front Feed Type of Stokers.

In the front feed inclined grate stokers there is a coal hopper extending across the front of the boiler and having at its bottom a "pusher," which is given a reciprocating motion, and pushes the coal out at the lower side of the hopper on to a dead plate, where it begins to ignite. As the coal is moved out into the fire space it gives up its volatile matter and the solid portion is forced on to the sloping grate surface and burns there. Immediately back of the coal magazine and extending from side to side of the stoker is a short fire brick arch.

These features are common to all makes of this class, but, of course, there are variations in the details of construction. In the Roney, which is the most widely known of this class, the grates are so arranged as to form a series of steps extending from the dead plate down to the dumping grate at the rear of the furnace. These grates extend from side to side of the stoker, and by means of a mechanism at the front are made to assume the stepped and an inclined position alternately. This allows the fuel to gradually move down the grates and the refuse is finally deposited on the dumping grate, from which it is removed from time to time by the attendant.

The Brightman resembles the Roney very much. The grates are straight bars having lateral lugs on each side which overlap the lugs on the next bar when in position. These bars lie in the furnace in the direction of the axis of the boiler and each alternate bar is stationary. The movable bar is given a slight horizontal motion and the fuel bed is thus agitated and made to move down the incline of the grates. At the rear of this incline is a clinker basket, into which the unburned material drops and from which it must be removed by the operator.

The Wilkinson is another stoker of this class. The feature of this stoker is its grate bars, and the means used to introduce air to the bed of fuel. Each grate is a hollow casting having the top surface a series of steps. In the riser of each of these steps is a slot. At the upper end of each grate is placed a small steam nozzle, which serves to inject air into it and so by slots out into the bed of fuel. The grates are given a slight reciprocating motion in order to force the fuel down the incline. At the rear of the grates the unburned portion of the fuel falls into a closed ash pit.

A number of other front feed stokers have been placed on the market from time to time, some of which are now manufactured, while others have proved total failures from either an engineering or business standpoint. The ones that I have mentioned will cover the general features of construction.

Underfeed Stokers.

All stokers so far mentioned can be brought under one head and termed over feed. Another type in which an entirely different principle is used is known as the under feed. In this case the fuel is forced up from underneath and burns on top of a heap, which forms in the middle of the furnace. A volume blower is used and air is forced up through the heap of coal from openings in tuyere blocks which are located at the point where the fuel is supposed to give off its volatile matter. There are two makes of this class of stoker. In the Jones the coal is forced in beneath the heap in large charges by a steam ram. The American is a copy of the Jones in all but its feeding device. Instead of a ram, a cone shaped screw is used, being driven by a small reciprocating steam motor. All stokers of the underfeed type must have the unburned refuse removed through the front of the furnace, in the same manner as in hand firing.

Mechanical Stokers Prevent Smoke.

In making a comparison between mechanical stoking and hand firing the most noticeable item is the smoke. With a properly constructed stoker used in connection with a stationary steam boiler having its heating surfaces and passages for gases properly designed and constructed, no smoke should issue from the stack, whether the fires are being cleaned or not. Of the cloud of smoke hanging over the city of greater Pittsburgh, about 75 per cent. comes from soft coal burned under stationary boilers. Of the smoke so made 98 per cent. can be avoided and a saving of at least 15 per cent. be made in the cost of steam generated.

A point that has often been made against mechanical stokers is that they will not work a boiler to its full capacity. This may be true of a stoker in which the bed of fuel is not disturbed, allowing the clinker to cement together and thus shut off the passage of air through the fire. But with a stoker which is self cleaned, having its entire grate surface free from clinker at all times, there is no trouble in working a boiler from 40 to 60 per cent. above its normal rating and securing good economy and smokeless combustion.

Here is a point that should be considered in first cost of plant. You may have a 500 horse-power boiler and decide to put in a certain stoker, because it costs less, that will not work the boiler to more than 10 per cent. above rating. Another stoker, which may be a little more expensive to install, will work the boiler easily to 25 per cent. above its rating, giving good economy, and in case of a sudden demand can be made to force it to 50 per cent. or more above rating. In both cases your boiler cost is the same, but in the first case you have but 550 horse-power, while in the second you have 625 and can get 150 horse-power or more. It is very easy to see which is the cheaper when cost per horse-power developed is considered.

The Saving Accomplished Over Hand Firing.

As to the saving that can be made by the use of mechanical stokers, about the only reliable figures are those taken from the books of manufacturing concerns where an account is kept of the boiler house expense per unit of output. These figures can generally be obtained from the manufacturers themselves, but could hardly be embodied in a paper of this kind. When fuel alone is considered the saving will seldom fall below 15 per cent., and in large plants when the total cost of maintenance is considered, including labor and cost of repairs, the saving will be much above this.

In 1895 an investigation was carried on at the Ohio State University which is of much value in this connection. A series of tests was made to determine the amount of saving that could be made by stoker firing over hand firing. The conditions were as near alike as possible in both cases. When the same high grade of coal was used for both methods a saving of 16 per cent. was found in favor of the stoker. When a cheap grade

of coal was used in the stoker and an expensive smokeless coal for hand firing, a saving of 50 per cent. was shown in favor of the stoker. A number of other comparisons between different coals were made and the results were embodied in the report of the university trustees of that year.

The strenuous advocates of hand firing will point the finger of scorn at the many so-called total failures of mechanical stokers. But did they ever look into the cause of these failures? I will admit that schemes of stoking have been invented that were not practical, but this is not saying that the whole subject is impractical. I have in mind now a case where an entire stoker equipment was condemned and thrown out because the arm on the damper shaft was not put on parallel with the damper. They tried to work the fires, supposing the damper to be open, and when they could not of course the stokers were at fault. They tried hand firing with the same result, and then found the cause. Cases of this kind were formerly of frequent occurrence. One thing that is often met with is a boiler plant having good boilers and stokers and a stack insufficient to give ample draft. Connecting the boilers and stack will be a flue so constructed that the draft is almost entirely shut off. If your boiler plant is not giving you satisfaction look it all over and the chances are, if you have been wise and bought a good stoker, that you will find the trouble at some other point.

The question to-day is not shall we use a stoker, but what stoker shall we use. This is true no matter what the size of the plant may be.

Ore Concentration by Oil.

LONDON, February 28, 1903.—The concentration of ore by the oil method seems to be growing in popularity. Many experiments have been made, and all point to the practicability of the system. Copper ore is being concentrated by oil both in Wales and Cornwall; the ore is low grade, and the success undoubted. Plant has been ordered for one of the British Columbian companies, and Norwegian concerns are busy experimenting. Now comes the news that two well known companies, Le Roi No. 2 in British Columbia, and the Lake View Company in Western Australia, are to erect initial plants at their mines.

The tests in Cornwall show that the labor cost in running a small plant is under 9 pence per ton—this, of course, irrespective of the costs of crushing the ore before the pulp is delivered to the oil process. A leading South African house in London associated with Rand mines have submitted the oil reduction plant to the scrutiny of its experts, and have taken an interest in rights to use the system in South Africa; while the well-known mining machinery manufacturers, Fraser & Chalmers, have also identified themselves with the new process. For some time operations have been conducted in London so as to afford the facilities of testing the ores from different parts of the world and different mines, and, in particular, proving the capacity of the plant to deal with gold and copper ores. One important advantage claimed for the process is its capability of dealing with refractory ore containing mixed minerals.

It may be remarked that a plant to deal with 100 tons per day would require power—exclusive of that required for crushing the ore—equal to but 7 or 8 horse-power. The cost of a 25-ton-per-day plant—termed one unit—would be, f.o.b. London, about £750; but the cost works on a sliding scale in case of more than one unit. The approximate cost of a four-unit plant to deal with 100 tons a day would be £2100. Among other advantages claimed is that the plant is of no great weight, and that there is no excessive wear nor costly portions, such as rubber belting and similar contrivances used in jiggers or vanners, where there is great wear and tear. The water required to deal with the ore can be used over and over again, as also can the oil. The waste of oil—and that not waste really—is very slight, approximately an absorption or partial loss of about 1 gallon to 1 ton of ore. The working of the plant is especially cleanly.

S. G. H.

The Demand for Coke.

Noteworthy Facts on Possible Increase in the Production.

BY FREDERICK E. SAWARD, NEW YORK.

No trade in this country has shown so great an impetus within the past year or two as that of coke for metallurgical purposes. The tonnage is growing, but it hardly keeps pace with the use thereof, hence the following facts may be of interest as showing what has been and can be done.

The production of coke in Alabama in the year 1902 amounted to 2,232,326 tons, against 2,180,625 tons for the year 1901. While an increase of only 51,701 tons is shown, it must be admitted that this is a good showing in the face of the fact that large receipts were had from other sources and there was such a strong demand for coal that no effort was made to increase the production of coke. The estimate is made that during the year 1903 the output will be increased by 250,000 tons. No less than 500 new coke ovens will be put in operation during the next 90 days, and these will add to the total output. The old ovens are to be worked to their fullest capacity, thus enabling home production to offset the necessity for importations of this class of fuel. One of the latest items in this connection is that Atlanta capitalists have purchased a tract of land at Gadsden, Ala., and formed a corporation with a capital stock of \$100,000, under the name of the Big Brushy Coal & Coke Company. Mines will be opened near Littleton, Ala. A large coking plant will be built and coke will be manufactured.

The Maryland Steel Company at their plant near Sparrow's Point, Md., will have 400 by-product ovens when work now under way is completed, say in about 90 days; the first battery of 50 has been completed, and the output is 300 tons of coke daily, which will be used in and about the works for fuel; the plant comprises the most modern appliances of every description for economical handling of the coal and coke. The possession of this coke plant will enable the Maryland Steel Company to manufacture their own coke, securing economies not only in the mere process of coke making, but by saving the by-products.

The coke output of the Connellsville district for 1902 aggregated 14,138,740 tons. This output is about the same as the year before, but was greatly restricted by lack of railroad equipment. Nearly 2000 additional ovens are to be built and the 1903 production will show a great increase. The tonnage from this district is now running at the rate of 250,000 tons a week, and would be greater but for insufficient car supply. Advices are that the Weaver Coal & Coke Company have taken out a sheaf of charters and contemplate the creation of a number of towns with civic utility enterprises in Indiana and adjoining counties, including coke ovens and adjuncts, and this will add to the supply from the Allegheny section. By the way, there have been figures much above normal recently quoted for coke made in the Connellsville district; one operator is said to have sold all his supply up to July 1 to a furnace in the Mahoning Valley at \$7 a ton; this is a very high figure, and no such value can be expected to continue after the numerous ovens now building in various parts of the country are completed, yet one can hardly look for any \$3 coke for some months to come.

The Connellsville Central Coke Company own a large body of coking land in Fayette County, in the Lower Connellsville region. They also have in operation 200 coke ovens and have decided to build 150 more during the early portion of this year, making 350 ovens in the plant. With these it is believed that 500,000 tons of coke annually will be made for the market. This company are one of the many new corporations hurrying into the coke trade since the retirement of the H. C. Frick Coke Company from the open market.

The Wabash extension will develop coal lands in Green County, Pennsylvania. The engineering corps are working toward Waynesburg from the river, making the last survey. Just how soon this work will be com-

menced in point of construction is not known. It is stated that coal developments, the erection of coke plants, &c., will soon follow the Wabash building into Green County.

An important development by Pittsburgh parties is of a tract of 4600 acres in Barbour County, West Virginia, on the line of the Baltimore & Ohio Railroad. The company are making arrangements for the immediate development of the property, and have submitted plans for the construction of mine cars, electric haulage and steel tipples to a Pittsburgh mine equipment firm. The new company are known as the Pennsylvania, Cleveland & West Virginia Coal Company. Another interesting transaction is that by which Berthold Floersheim of Pittsburgh turned over to a company known as the Hampton Coal & Coke Company, comprising Pittsburgh and Eastern men of capital, the tract of land recently gathered together by him in Upshur County, West Virginia. It contains four workable veins, the Masontown, "Big Eleven," and the upper and lower Kittanning seams. The coal and coke made from the coal are of a superior quality. The Wabash, the Baltimore & Ohio and other coal roads making important extensions through Upshur County will give facilities for competing transportation which will be unequalled.

The Sheffield Coal & Iron Company of Sheffield, Ala., have now secured a supply of coke for their own account from the coke plant of the Stone Gap Colliery Company, who have just completed a portion of their ovens at Glamorgan, Wise County, Va. This is a practical and another evidence of the necessity that the iron industries of the country secure, at first hands, a full and regular supply of coke. Don H. Bacon, chairman of the Tennessee Coal, Iron & Railroad Company, in the just-issued annual report of that company, says in regard to the coke supply for company uses, that competent men are giving careful attention to the production of coke, with the result that the percentage of yield has increased, the quality improved and the quantity consumed per ton of pig iron made has been lessened.

The by-product ovens at Everett, Mass., are doing a great business. There has been a heavy call for coke, owing to the drop in prices from \$8 to \$7 a ton on this fuel for domestic purposes, and the New England Gas & Coke Company have been taxed to their utmost to make deliveries as agreed. Heavy calls come from the suburban towns and cities for this fuel, where the price of anthracite still remains at \$9 and \$10 a ton. This enterprise, founded by Henry M. Whitney, in his efforts to make use of the Nova Scotia coal property in which he had large investments, has proved to be of the greatest benefit to certain portions of New England. Upward of 2000 tons of Nova Scotia slack has been carbonized daily, with a resulting 1200 tons of coke from 300 ovens.

As compared with our Connellsville district, it is interesting to note that the great coke making district in England, that of Durham, turned out only 4,701,437 gross tons last year from 12,571 ovens. Surely this does not compare favorably with work on this side of the water. At the close of the year 3692 ovens were unemployed.

The Chapman Yard Hydrant.—The Chapman Valve Mfg. Company of Indian Orchard, Mass., have added a new yard hydrant to their line of manufacture. These hydrants are especially designed to meet the requirements of service in railroad yards for washing cars and filling water tanks; for water works service, where a number of families obtain their water from one source of supply; for stables, carriage houses, stock yards, street washing and lawn sprinkling; in fact, for any service where it is important to have a water supply that shuts off below the frost line, and are self draining to prevent freezing. They are made either for operation by means of the ordinary screw and hand wheel or by spring lever, the downward pressure of which opens the valve, the spring drawing it back and closing the valve automatically when this pressure is released. The hydrants are of extra strong design in all working parts and are made with the Chapman automatic drip valve at the bottom of the post.

The Moseley Commission Unrepentant.

LONDON, February 28, 1903.—The Moseley Commission is now back and its members have been expressing themselves freely about their experiences in America. If the promoters of this scheme imagine that the British labor leaders have come back impressed with the overwhelming superiority of American methods and American workmen, and are in consequence likely to stimulate their own followers in this country to increased effort, then I fear nothing but disappointment will result. The opinions thus far expressed by that section of the commission concerned with the engineering and metal trades, while giving full credit to all that is best in American workshop practice, are none the less quite emphatic that we do things better in this country.

For example, Matthew Arrandale, the secretary of the United Machine Workers' Association, refers in his annual report to his recent visit to America. A short paraphrase of this report is suggestive. It indicates clearly enough what an intelligent workman thinks of American practice. He states that the planers in American shops are known as machinists, a term which in-

ly upon inferior workers. It differs from the English piece work system, in that prices when once fixed may not be reduced. Mr. Arrandale is convinced, however, that the worker in this country is as well off as the workers are in America. Our people, he states, work as hard here as they do there, our machines run quite as quickly, and could our employers see their way to pay men for their ability, as they do in America, no doubt the same amount of work could be got out of the machines, for while in America the employers recognize that the more money that can be earned the more profit is left for the employer, in this country the employers object to a man earning more than a certain amount, let his capabilities be what they may.

One other point, he continues, is that in many cases they will not take on a strange man who is over 35 years of age; yet once a man is taken on and gives satisfaction the firm do not discharge him or reduce his wages when he becomes old in the service of the firm. The American worker receives much higher wages than we do in this country, but, on the other hand, the necessities of life are much higher than here. House rent is much dearer, railway traveling is much dearer, food in many



THE SCHWARTZ MELTING FURNACE.

cludes fitters, turners and any others capable of taking a job of any description and completing it. Their rate of pay is \$3.25 a day, or 13 shillings 6½ pence, for nine hours, the week being one of 54 hours. At slotting men average 1 shilling ½ penny per hour, drillers get 8 shillings 4 pence a day, and the men engaged on milling machines average about 10 pence per hour per machine, but almost invariably they work two machines. With regard to night work, 12 hours is the specified turn, which for five nights equals a 60-hour week. There is no extra pay for night turns, but if men cannot be had for ordinary pay most firms will add 2 to 3 pence per hour extra. The one-break system is general throughout the country—that is, men have their breakfast before they go to work in the morning. If a man is not at his work at 7 o'clock he is not allowed to start until noon. Throughout the States there is a strong desire on the part of the employers to specialize both men and work and machinery.

Referring to tool makers, Mr. Arrandale says that they aim at introducing labor saving machinery, but nowhere did he find much attempt to introduce wage saving machinery. The employers seemed to value the machinery more than the people, being ready to pay any price for a machine, while the human agent is often regarded as of no value. He found the bonus system in operation in a great many places, the effect being that every inducement is given to men to earn the most possible. This is all right for the best men, but bears hard-

cases is much dearer, and more money is spent by the American worker in amusements than is done here, while domestic life altogether is not nearly so comfortable in America as it is in this country. On the whole, he comes to the conclusion that the lot of the worker in this country is equal to, if not better, than that of the worker in America.

S. G. H.

The Schwartz Melting Furnace.

The engraving here presented shows a special design of the Schwartz metal melting and refining furnace, manufactured by the Hawley Down Draft Furnace Company of New York and Chicago. Instead of the removable bottom plate, as in the regular pattern, the entire upper part of the cone is arranged to be lifted off by the aid of an overhead hoist or crane. The cone is provided with hooks for this purpose, and a special arrangement is made for the blast pipe, with sliding sleeve instead of a stuffing box. The oil pipe is provided with a special brass union, allowing coupling or uncoupling readily. The joint between the removable cone and the bottom shell is made by bolting angle iron rings together. A charging door of the usual dimensions is provided at the top of the cone, so that the furnace may be used in the regular way as the ordinary pattern. This furnace has been designed so that large pieces of metal or scrap may be introduced without first breaking into pieces, as is necessary in the original type.

Labor Crisis in the Scotch Shipbuilding Industry.

GLASGOW, February 20, 1903.—The absorbing topic here and in the North of England for the past fortnight has been the wages controversy in the shipbuilding and engineering industries. So sharply did the situation materialize that until a few days ago it seemed as if we were drifting rapidly to a complete lock out, not only here, but all over the country. A situation so critical is of such grave importance to the iron and steel trades on both sides of the Atlantic that it merits our attention. That labor relations in the shipbuilding industry should reach a crisis surprised no one who has been watching the course of the trade during the last two years. There is, indeed, room rather for surprise that the crisis did not occur sooner, considering the depression which has marked some of the shipbuilding centers for several months past.

North of England Yards Take the Initiative.

It so happened, however, that while employment was steadily and even rapidly receding in the North of England yards during last year, and especially during the latter half of it, the shipyards on the Clyde were pretty well engaged on contracts. In the North of England so empty became the shipyards by the cessation of orders for ocean "tramps," which are their principal product, that notifications of reductions in wages were made some four months ago. After a great deal of discussion all the trade unions through their local branches agreed to accept the reductions proposed, except two. The abstention of these two brought about a state of deadlock. The workers who refused to accept terms which the other trade unions recognized to be justified by the state of the trade were those belonging to the carpenters' and joiners' and to the plumbers' societies. It so happens that the Joiners' Union and the Plumbers' Union contain a majority of members who are not engaged in the shipyards at all, but who find constant employment in the building trade and other occupations which are not showing any signs of depression. These argued that if their shipyard members accept a reduction in their wages the same reduction will be forced upon the other members in other trades where no necessity exists. The North of England shipbuilding industry was brought to a condition of despair because the house joiners and the domestic plumbers were bent on resisting all reductions in their trades.

This was the situation when the Federated Shipbuilders of the Northeast Coast addressed an intimation to the trade unions which had accepted the reduced wages. They said that it was impossible to carry on the shipyard work with the joiners and plumbers on strike, and that it was equally impossible for them to give way to the joiners and plumbers. Therefore they would be compelled, and were fully determined, to shut down their yards unless harmony of feeling was established. In the hope of finding means of averting so disastrous a development a conference was held between representatives of the federated shipbuilders and of the various departments of shipyard workers. At this meeting it was agreed to remit the case of the dispute with the plumbers to arbitration. A joint committee of representatives of the employers and of the other trade unions concerned was appointed to confer with the joiners on the position, and that committee is endeavoring to effect a settlement on the basis of a compromise by which the joiners will accept a reduction of 1 shilling per week. Meanwhile the stoppage caused by the joiners will cost the employers more than they will now gain by the reduction in wages.

The Action Taken in Scotch Yards.

The development in Scotland was later. It was not until the beginning of this year that the employers here gave notice of reductions to all the trade unions employed in the shipyards and marine engine shops. The notices were issued by the two separate federations of shipbuilding and of engineering employers, but they were all to the same effect and to the same extent—viz., 5 per cent. on piece wages and $\frac{1}{4}$ penny an hour on

time wages, equal to from 1 shilling to 1 shilling 2 pence per week. It was proposed that these reductions should take effect early in February, but at the request of some of the trade union officials the date was postponed until the middle of the month, so as to afford the men more time to consider and discuss the situation. There have been successive conferences between committees of the employers and representatives of the several trade unions. The men were left under no illusions as to the position, or at all events the trade union officials were not. The prices of material are lower and capital has been ungrudgingly applied in the reduction of the costs of manufacture. It remains now for labor, which is the chief item in the cost of production of a modern steam vessel, to assume its share of the burden.

Reduction in Costs Imperative.

The position broadly is that a large reduction in costs is imperative for the salvation of our shipbuilding industry. If the wage earners will not co-operate with the employers in effecting the necessary reduction the yards will rapidly become idle through want of orders. Happily the Scotch shipbuilders have been able to impress their men with the bearing of the movement on their future employment. Moreover, they conciliated trade union jealousy by insisting on the fact that the reduction in wage is to be general and identical and that no class of workers will be favored over another.

Thus we are just emerging from a period of danger, thankful that the imminent peril is past if perfect safety is not yet secured. The wage agreement when complete will hold good for six months, and it is hoped that in that time so many orders will be scooped in that the reduction may be restored. This is, however, very doubtful, considering the overcrowded state of shipping.

A Mammoth Oil Carrier.

American readers will be interested in a gigantic oil carrier called the "Narragansett," which Scott & Co., Greenock, have just launched for the Anglo-American Oil Company, Limited. This vessel is remarkable as the largest bulk oil carrier afloat, the largest vessel yet built on the lower reaches of the Clyde and structurally one of the heaviest ships ever launched on this river. She is 531 feet in length, 63 feet 6 inches in breadth and 42 feet in depth, with a gross tonnage of about 11,000, a dead weight carrying capacity of 12,500 tons, of which over 11,000 tons will be oil in tanks and 1500 tons either coal or oil fuel, and a displacement when fully loaded of about 21,000 tons. Owing to the number and arrangement of the subdivisions she is besides practically unsinkable under any circumstances. There are 18 cross bulkheads and the compartments are further divided by longitudinal bulkheads, forming in all 27 separate compartments below the main deck. To be oil tight this involved a test by water with a head of 20 feet above the main deck. The number of rivets used in the construction of the vessel is over 1,250,000. In spite of the unusual difficulties presented by the enormous size of the ship the testing of the tanks was a series of successes, the water being pumped from one to another as fast as possible, each tank proving thoroughly tight at the first trial.

The machinery consists of a set of triple expansion engines and six large single ended boilers, capable of generating steam to develop over 550 horse-power, which will propel the vessel at a speed of 14 knots. The cylinders are supported by six split columns, three of which carry a circular condenser, formed of steel plating, of large cooling surface, and supplied with water by an 18-inch centrifugal circulating pump driven by two independent engines. There is a complete installation of auxiliary machinery, including two sets of slow speed boiler feed pumps, feed heater and evaporator, feed filters and silent ash hoists (self tipping) in each stokehold. All these exhaust into a combined auxiliary condenser and feed heater having a total surface of 950 square feet. The boilers have a working pressure of 200 pounds per square inch and are placed three abreast in two stokeholds. They are worked under natural draft, and the funnel, which is 15 feet in diameter, rises to a height of 105 feet above the grate bars.

The shafting is in excess of Lloyd's requirements and the propeller is of 20 feet diameter and is fitted with four adjustable bronze blades.

Unlike most of the "tankers" now in service, the propelling machinery is placed amidships, which necessitates the arrangement of a tunnel passing through the after oil tanks. It is circular in form and passes through eight separate oil compartments. Two oil tight pump rooms are fitted forward and aft of the machinery space. These are entered from the upper and shelter decks. In these are fitted the oil pumps, four in number, which are capable of discharging the oil at the rate of 900 tons per hour, or the whole cargo in about 12 hours. Steam pumps are also fitted for pumping out the tunnel and the various ballast tanks, which consist of the double bottom under the machinery, the peaks and a large deep tank forward. The oil tanks are also available as ballast tanks in the event of the ship requiring to make a light voyage.

Arrangements are also made for turning the vessel into an ordinary cargo steamer within a few hours after her employment as an oil carrier. For the thorough cleansing of the oil tanks from oil steam connections are arranged to all the tanks, and a complete system of ventilation has been adopted for clearing the tanks of gas. A large fan is fitted in each of the pump rooms and connected to each of the tanks by pipes for the supply and suction of air. The cargo gear on deck consists of 16 derricks and nine large and specially designed steam winches. In addition to the center line of hatches, which communicate by oil tight trunks with the oil tanks, side hatches are fitted to the upper and lower between decks, which are always available for cargo, even when the oil tanks are full. These between decks are lighted by side lights through the ship's side, so that the vessel can if necessary be made available for carrying cattle or troops. But her primary duty is to carry the biggest bulk cargoes of petroleum ever heard of from the United States to Europe. B. T.

Engineering Notes.

"Experience teaches," says the adage. Sometimes it does and at other times it doesn't; for two years last past the best minds in the British Navy have endeavored to find the cause for the leakage in the boilers of the "Hyacinth," but are unable to locate it. Mr. Billings said that if a man did not strike oil after a reasonable time he either had a poor gimlet or was boring in the wrong place. This seems to apply to the trouble with the "Hyacinth." Possibly the seekers after the fault are looking for obvious holes or pipe joint leaks through which water sneaks out, but it is also possible that the difficulty lies elsewhere, and with the type of boiler that is in the "Hyacinth" it is quite probable. It is known that they furnish saturated steam upon little or no provocation, and if the steam was tested for moisture perhaps a portion of the missing water would be found smuggled over into the main steam pipe. A great deal can be carried over in that way.

The uses of the X-rays are many, and sometimes marvelous, in a certain sense; also, there are times when they greatly embarrass those subjected to them. It is reported that speculations have been discovered in the Japanese mint, and some of the employees were supposed to have swallowed gold coins of small denominations. Upon testing suspected persons the coins were detected in their stomachs.

Tenders for building the 25-knot ships of the Cunard Company have not been made yet, shipbuilders being very shy of the proposition, and properly so, for the power required to be developed is something to be respectfully considered, in both boilers and engines. It is not only the first step which costs, but all the others which come after, shafts, screws, coal bunkers, &c., and it is a question whether it will not require two ships, one to carry the machinery and boilers, the other to be towed, carrying the passengers and crew, for even 23-

knot ships give up nearly three-fourths of their space below decks for the propelling power. It is safe to say that it will be some time yet before ships which can make 25 knots, sea speed, will be afloat, for there is much virtue in a name. Twenty-three-knot ships mean that under favorable conditions that velocity can be attained, but it by no means follows that such vessels can reel off 23 knots from the log every 24 hours; the average from port to port is much less.

The advent of a new type of locomotive on British railways is, perhaps, a result of the visit of English railway engineers to this country some months ago, for the engine in all essential points is American, with the exception of the number of cylinders thought necessary, no less than three, all high pressure. The boiler and fire box are of the Wooten type, with nearly 43 square feet of grate surface and 72 inches diameter of shell, and it carries 200 pounds per square inch; the total heating surface is 3010 square feet, about twice as much as the usual tank engine of English design. It is apparently intended for suburban passenger traffic, and will, perhaps, be considered by some as a monstrosity.

The proposition to establish a commission to revise the "General Rules and Regulations" of the Treasury Department respecting marine boilers is a good one, viewed with favor by all constructors, who have for years suffered many hardships from decisions affecting their interests. Some of the demands in the rules aforesaid are contradictory and impracticable, and in the light of better information since the rules were first made are absurd; they call for material which cannot be had in market, 29-32 inch rivets, for example, and reckon the pitches of the same to the thousandth part of an inch. There are a good many other details which, while they may be theoretically correct as regards the strength of riveted joints, are really of no practical value as affecting the integrity of the boiler itself. Also, it is to be hoped that the commission, when it is appointed, will take in consideration the matter of licenses for marine engineers, and grade them strictly in accordance with the qualifications of the candidates. The clause, page 60, paragraph 5, from the top, works a hardship in the case of candidates who have failed to pass examination for original licenses; they cannot be re-examined under one year, and must then present a letter from the board which originally examined them. It is quite within the chances of life that some candidates may have changed their residences during a year and are hundreds of miles from their former abodes. To require letters from the board which first examined a candidate causes useless routine and red tape, which might be avoided by giving a rejected candidate a circular letter reciting the case and entitling him to another examination at any time thereafter, even 30 days. Jobs are not apt to hold over 12 months, and young men are unable to wait that length of time for their certificates. Again, regarding the qualifications of third assistant engineers, it is provided that any engineer whose license is designated by tonnage may act in a similar capacity on any steamer of larger tonnage if the engine in said steamer is not larger than the one to which his license restricted him. As all these rules are followed to the letter of the law by inspectors, it follows that an engineer may be debarred from taking a situation if one cylinder is $\frac{1}{2}$ inch larger in diameter than the other, for "larger" in this connection means the relative diameters of cylinders. There are many other instances of injustice in the licenses, which are, of course, unintentional, for the officers appointed to carry out the laws have no voice in the interpretation of them, but must observe the plain letter of them as construed by intelligent minds. The commission, if appointed, has an arduous task before it which will tax all its energies and abilities to do the subject full justice.

J. A. Middleton, second vice-president of the Lehigh Valley Railroad, Philadelphia, announces that all communications relating to the purchasing department should be addressed to him.

Automobile Machine Tools.

BY GEORGE E. WALSH.

The remarkable development of the automobile industry in the past few years has created an entirely new class of machine tools, which in the aggregate represent a considerable factor in the trade. The standardization of the different parts of the automobile has been the aim of manufacturers for some time past, and when this has been accomplished the cost of the machines can be reasonably reduced. The history of the industry is following in the footsteps of the bicycle trade, and reasoning from this we may look forward hopefully to such a reduction in the cost of the automobiles as will enable thousands to purchase them who are precluded from it to-day because of the expense.

It is true that the industry has already reached proportions which require an investment of capital upward of \$60,000,000, and nearly every manufacturer has all the orders for the current year which he can fill. Nevertheless with the standardization of the different parts factories will multiply, and shops will be established for assembling the machines. More and more will the trade become specialized. Factories will be devoted to the manufacture of single parts, which will be suitable for a number of different kinds of standard machines. The expense of making these different parts will be much less than to-day, because of the improved machines for the work.

Builders Experimenting and Improving.

The group of new machines for making the different parts of automobiles have only partly reached a point of permanent development, where few other improvements can be made in them. Nearly all the plants are to-day engaged in experimenting and improving. With Edison's new storage battery for the electric automobiles perfected, it may be that considerable changes will be immediately created in the plants devoted to this type of machine. It will certainly require the making of new machine tools to turn out the different parts of the battery and its equipments.

Automobile manufacturers are conservative in their final adoption of new machinery for their plants, because of the constant changes being made in the industry. It is too early yet to predict the exact automobile of the near future. There are hardly two plants which use exactly the same machinery. Nearly everyone has its own plans and types of tools and machines, and these have been drawn and made chiefly in the home shop. Of course, the main part of the machinery for cutting, drawing, planing and turning differs comparatively little from that found in any mill where similar work is done, but the special tools perfected for certain lines of careful work are the outcome of experiment and careful tests.

Manufacturers of automobile machinery and shop tools are closely anticipating the needs of the trade by designing new types for particular work. A good deal of money is being spent in this way, the manufacturers being satisfied that in the near future they will redeem all by the adoption of the right type. At present the difficulty is that the automobile factories turn out the complete machines under one roof, and consequently the number of different parts made in a single day or week is not sufficient to warrant extensive investments in special types of machinery. The expansion of the industry so that one factory is devoted to the manufacture of a single part or group of parts will completely change this condition. Then special machinery will be in greater demand, and manufacturers will willingly invest their capital in the tools and machines.

Tools Inherited from the Bicycle Trade.

It is a fact worth noticing that a good many parts of the automobile have to-day reached a certain standard which will permit of few changes or improvements. This naturally opens the door for machine and tool manufacturers to produce the very best for the plants in the form of permanent fixtures. The heavy machines for cutting and turning have already become permanent

parts of the automobile plants, and there are numberless smaller tools for screwing, drilling and burnishing that have likewise been designed on a fixed basis. These tools and machines represent the foundation of the future plants where standard parts for the cheap automobiles will be made on an enormous scale. A good many of these tools and machines have been specially designed for the automobile factory, but to a large extent they have been inherited from the bicycle trade, and merely adapted to the automobile plants. With the decline in the bicycle industry, there was felt the need of enlarging the scope of the old manufacturers of wheels, and they included in their work the manufacture of different parts of automobiles. A good deal of their bicycle machinery could be modified and enlarged so that it would prove equally serviceable in the new field. Consequently we find in many automobile shops to-day bicycle tools and machines employed in producing a new order of things.

The development of bicycle tools and machines was remarkable up to within a few years, and the special mechanical appliances had simplified the manufacture of the steel parts so that the cost of making them was greatly reduced. The automobile trade was to a large extent founded upon this declining industry. The old standard machines that had been designed at a great expense and cost were not entirely lost when the change came. A little inventive genius in modifying them was sufficient to recreate them. The shop designs in some of these plants are therefore interesting and instructive by virtue of the fact that they practically illustrate American genius of adaptation.

The making and casing of ball bearings for the automobiles are essentially the same as for the bicycle. The same is true of the wire spokes, the steel hub, and the rubber tires. The assembling of a wheel for an automobile is about the same as for a bicycle. The mechanics who could do the work in the bicycle shops could easily turn their hands to the work required of them in the automobile plant. In half a dozen of the latter it was found that half the workmen and skilled mechanics had formerly worked in bicycle shops. They had learned their particular trade under conditions which prepared them for their present-day employment. It is this fact which has brought American automobiles rapidly up to the point where they are now being fitted to contest in the international races in Europe the coming spring. While France, and even Germany and England, took the lead in manufacturing automobiles, and for several years developed the industry before American manufacturers interested themselves seriously in the work, the superiority which they have claimed is now more apparent than real. A high grade and high power machine can be built to-day in the best equipped American shops, with full guarantees as to speed and durability, at less actual cost than in France and Germany. This is due entirely to the machinery and tools already adapted to the work. They represent the high-water mark of labor saving devices in this field, but at the same time they merely suggest the possibilities which may be realized when the standardization of the different parts becomes an assured fact.

It is equally patent to close observers of this industry that the designing and improving of old machines for this work cannot alone solve all the perplexities faced by the trade. Original designs of special machinery and tools must follow. Such special machinery is being added continually to the best factories, and it is performing its work with perfect satisfaction. The improved screw and turret machines designed to set a small lot of parts have already been developed in the automobile plants so that considerable time and labor are saved. Heavy turret lathes have been set up in the factories, with automatic feeders, to cut a number of awkward castings at once, while multiple spindle presses to drill a considerable number of holes at once are quite common. These presses are easily adjusted to almost any position or kind of work required, and they include about everything demanded for automobile work. The variety of small pneumatic tools in the modern automobile plant

is increasing annually, and they already represent a marvelous collection.

Standardizing Essential to Reduce Cost.

In order to reduce the cost of automobiles so they can be popularized among the multitude it is essential to standardize the different parts so that few changes will be needed from year to year, and then to reduce the shop force to the lowest minimum consistent with perfect operation of the machinery. Skilled hand labor is too large a factor in the shop yet to make machines of even the lightest weight for much less than \$500 to \$800 as an average selling price. The margin of profits in automobile making is small to-day, for the manufacturers are seeking their rewards in the future when the assembling of the machines in great factories can be done at one-half the present cost in plants where nearly all parts must be made under the one roof.

The specialization of the industry must grow rapidly in the next few years, but it can do so only as the machine tool builder opens the way. Everything depends upon him in the next step in the operation. If he cannot produce the special tools to simplify the making of the score and more small parts of the vehicle, it will be difficult for the manufacturers to render better work at less expense to the purchaser.

But there is little doubt about the ultimate success of the machine tool maker. Already numberless designers are drawing their plans for meeting this demand. New devices are being made to produce everything needed for the automobiles—both light and heavy vehicles—from the motors and batteries to the controllers, steering gear, carburetors, boilers, pumps, engines, wheels and valves. Each one of these should represent a special line of manufacturing, which in time should amply reward the expert. Nearly all the electrical concerns are opening new departments for making automobile batteries, steering and speeding gears, and motors and controllers. The work is profitable with them for the simple reason that the market demand is rapidly increasing for standard parts which can stand the test of actual experience.

To-day the automobile plant requires an invested capital out of all proportion to the actual profits because the simple tools, even when adapted from other lines of manufacturing, cost too much for the returns. There is no possibility of such a plant securing the most expensive and most refined tool machines for all parts of their work unless the capitalization is much increased. It is only by specializing the manufacturing work that the highest achievement in this direction can be hoped for. The specialist depends first upon the most elaborate and perfect tools and machines which science can devise for him, and then his products represent all that can be expected. He has advantage over the single large plant because of his superior equipment and special knowledge. Specialists in the smaller parts of the vehicles, which have practically become staples, are already in the field, and some large plants order these parts direct from the smaller shops. It proves a saving to them and helps to reduce the worry of detail work. The staple parts are required to come up to specifications and expert tests, and beyond that the parent plant can ask for nothing.

The advent of the special tool maker and tool operator in the automobile industry is consequently one of the most revolutionizing features of the work. Nearly all the large tool and machine manufacturers have made some bid for special automobile shop equipments. It may be only in some of the small, minor parts, but they are moving slowly upon the more complex problems. All they require is a certain standardization of all parts to make their invasion rapid and sure. Within a year or two then they would have the tool machines ready for lessening the cost of manufacture, and at the same time for increasing strength and durability.

The construction of the modern automobile is not so intricate and difficult as appears at first sight. The main questions that have occupied the attention of builders and inventors have been those pertaining to power, speed and durability. Like the bicycle, extended

tests were needed to find out the weakest points of the vehicles, and to ascertain where the greatest strain appeared either in fast speeding or heavy hauling. These questions are pretty well settled to-day, and their solution has opened the way for the machine and tool makers to step in and develop the manufacturing part to the highest point of efficiency.

The Automobile for Trucking.

A wide diversity of opinion regarding the best power for commercial motor vehicles was expressed at the discussion of that subject at a recent meeting of the Automobile Club of America in New York. It was agreed that steam, on account of being a perfectly elastic power, was the most suitable, except for the danger of the water freezing in the winter. E. T. Birdsall told of spending an entire winter's night on the Brooklyn Bridge with the thermometer at 20 degrees, endeavoring to warm up the frozen tubes of a steam truck. He thought gasoline would be best, provided competent drivers could be had. The engine should run at a constant speed, so that the driver would have only to change the gears and guide the vehicle.

Some interesting figures regarding the cost of operation of a gasoline truck were given by E. B. Galleher. The truck was of French manufacture and similar to those used in the French Army. It was bought by a firm which had been spending \$2700 a year for trucking and cost \$2600. It weighed about 3500 pounds, had four speeds ahead and one reverse, two sets of brakes, and the gears, which were of bronze and steel, were always in mesh. It had solid rubber tires $2\frac{1}{2}$ inches in diameter.

The engine was of 15 horse-power, with four cylinders. In 18 months' service the truck was not once in the repair shop, and the total repairs in that time did not amount to \$200. It averaged 25 miles a day, carrying a load of 3 tons at a rate of 10 miles an hour and climbing a 10 per cent. grade with that load. The truck not only carried a larger load, and at a higher speed than a horse drawn truck, but made a saving of over \$1100 a year in the trucking account. It was found that the cost of operation, including the wages of the driver, \$2 a day, and gasoline, \$1.50 a day, was about \$4 a day for 300 working days in the year, making a total of \$1200 on that account. Depreciation was figured at 10 per cent. of the original cost of \$2600, or \$260 a year, making a total yearly expense of \$1460 as opposed to \$2700 for the horse trucks.

The operation of the vehicle was so simple that any of the ordinary employees of the firm could run it, the only difficulty occurring when it was necessary to run it at a very slow speed, with frequent stoppages, in which case considerable care was necessary.

Reference was made to the excellent showing of other French commercial automobiles in some recent tests, one of which demonstrated a capacity of 40 ton-miles on a single gallon of gasoline, equal to carrying 5 tons a distance of 8 miles. President Shattuck remarked that this was twice as economical as his big gasoline touring car, which, with four passengers, weighs 3000 pounds and runs 13 miles on 1 gallon of gasoline, an efficiency of $19\frac{1}{2}$ ton-miles.

With gasoline at 15 cents a gallon, a capacity of 40 ton-miles means a cost of less than 4-10 cent per ton-mile. As horse transport has been proved from an experience of five years with 90 two-horse trucks to cost from 14 to 16 cents a ton-mile, it is evident that even with a liberal allowance for wages, repairs and depreciation the gasoline truck is much more economical.

There was a considerable difference of opinion regarding the economy of electric trucks, one user of two of these vehicles for delivery purposes stating that as far as his experience went they were not cheaper than horses, while the advocates of the electric vehicles were equally positive in their assertions to the contrary. It was pointed out that in the case of electric vehicles the nature of the service required has a marked effect upon the endurance of the vehicle, as a wagon which will run 51 miles on a continuous trip was found to be capable of but 35 miles, with frequent stops. Another case was quoted of an owner of an electric runabout who is able to run it 46 miles without recharging it and have power left, while his wife cannot run it over 20 miles.

The Use of High Sulphur Fuels in Blast Furnaces.

Oskar Simmersbach has, in a recent number of *Stahl und Eisen*, an article on the above subject which, although it deals entirely with European conditions, will probably be of interest to furnace men in this country. He begins by referring to the fact that sulphur is not now considered nearly so formidable as formerly, and that furnace plants are in operation whose very existence is based on the use of high sulphur material, such as purple ore. Such materials are generally easily reducible, whereby the sulphur is disposed of when comparatively high in the furnace, whereas when present in more refractory ores or in the fuel it is not driven off until the material arrives in front of the tuyeres, where it comes in direct contact with molten iron. The tables in this article, showing that high sulphur fuel can be used under certain conditions, are results obtained by the use of anthracite with 3 to 4 per cent. sulphur.

Making Foundry or Bessemer Irons.

In the manufacture of foundry or Bessemer irons the most important desulphurizing agents are lime and magnesia, which, in the presence of carbon, form sulphides. If alumina is present lime is the most potent; in its absence there is no difference. Basic silicates of alumina are of no use for the purpose in question, but the alkaline silicates, if they contain an excess of bases, are effective, presupposing always the presence of carbon. Further than this, silica cannot do the work of lime, although when only a small quantity of sulphur is present and the temperature is high the monosulphide of iron is broken up by silicon. In the latter case a compound corresponding to the formula Fe_2Si or Fe_3Si (according to Wedding) is formed, and the sulphur disappears as carbon disulphide. With high sulphur fuels, however, the case is different, because at the first sign of free silica, or, in other words, of a "sharp" slag, the sulphur is enabled to combine with the iron and, however low the blast temperature, a pig is obtained with 0.2 to 0.4 per cent. sulphur and 3 to 4 per cent. silicon. The fact that there is no choice as to the degree of basicity of the slag, which, on the contrary, must always be made as limey as possible, is what constitutes the chief difficulty in the production of foundry iron with high sulphur fuel. Sulphur in large quantities can only be taken care of by lime, and sulphide of iron is more easily broken up thereby the higher the temperature and the greater the quantity of carbon present. The perfect combination of lime and sulphur is much facilitated by having a large body of slag, a fact which, though quite explicable, is often insufficiently considered.

The quantity of slag and the blast temperature have a certain relationship to one another, because the smaller the amount the higher the temperature needed to obtain the same result, whereas a lower temperature suffices for a larger amount of slag. This is shown by Nos. I and II of the following analyses for foundry iron and by Nos. VIII and IX for Bessemer:

Table I.—Foundry Iron (50 Per Cent. Soft and 50 Per Cent. Refractory Ores).

	I.	II.	III.	IV.	V.	VI.	VII.	
Iron.	2.00	2.35	2.16	3.35	3.50	3.68	4.01	
Mn	0.75	0.57	0.48	0.67	0.65	0.55	0.70	
S	0.050	0.020	0.018	0.030	0.050	0.072	0.048	
Blast temperature, C.	640°	750°	800°	740°	725°	700°	700°	
Slag per 100 iron.	125	123	108	125	125	125	128	
SiO_2	34.03	32.90	33.74	34.88	38.82	39.34	36.06	
Al_2O_3	4.27	6.51	4.95	5.42	7.92	6.69	8.52	
FeO	0.77	1.83	0.79	1.25	0.45	0.67	0.64	
Slag.	MnO	0.49	0.39	0.35	0.66	0.48	0.54	0.35
CaO	47.98	48.72	46.81	45.07	41.00	40.82	44.41	
CuS	9.38	6.48	8.96	9.34	7.52	8.64	8.10	
MgO	2.21	1.68	3.11	2.29	2.43	2.33	1.48	

In any case, however, there should be more slag than pig iron in the furnace, the proportion being about 125 to 100, with blast temperature of 650 to 700 degrees C., and 115 to 100, with 750 to 800 degrees C. If the temperature sinks too low, for instance, in making Bessemer iron from refractory ores to 600 degrees C. and lower, a complete disintegration of iron sulphide does not take place, and the free sulphur cannot combine completely with the lime; a doubly injurious effect

is caused and the pig shows high sulphur, as in analyses Nos. XII and XIII.

Table II.—Hematite (100 Per Cent. Refractory Ores).

	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.
Iron.	2.50	2.10	1.66	1.76	1.78	1.45	1.04
P	0.04	0.04	0.04	0.04	0.05	0.04	0.04
S	0.019	0.068	0.059	0.087	0.126	0.115	0.019
Blast temperature, C.	790°	660°	640°	640°	580°	610°	800°
Slag per 100 iron.	108	122	124	122	122	123	107
SiO_2	34.52	36.16	33.52	33.28	32.30	33.40	33.36
Al_2O_3	5.34	5.75	5.77	7.02	6.90	5.44	5.66
FeO	0.53	0.66	0.66	2.21	1.04	0.66	0.79
Slag.	MnO	0.27	0.39	0.47	0.39	0.39	0.31
CaO	46.29	46.15	47.88	44.96	47.82	47.72	45.23
CuS	9.63	7.67	8.84	9.47	9.45	9.18	11.07
MgO	3.05	2.84	2.25	2.09	1.80	2.30	2.38

Furthermore, since lowering the blast temperature, other things being equal, means lowering the silicon, it is a general rule that the lower the silicon in pig the higher the sulphur. Nevertheless, analysis No. XIV shows that with a very hot and basic slag it is possible to obtain from refractory ores an iron low both in silicon and sulphur.

Making Basic Iron or Spiegeleisen.

In making basic iron or spiegeleisen with high sulphur fuel the affinity of sulphur for lime is not of so much importance as its affinity for manganese. However, the two work together, the highly refractory sulphide of calcium combining with sulphide of manganese to a more fusible compound, according to the formula:



This, however, is subsidiary to the separation of sulphur by metallic manganese, according to the formula:



The latter reaction is all the more effective because sulphide of manganese is soluble in molten silicates and by reason of its high melting point solidifies more easily than carburized iron.

Metallic manganese cannot, however, exist in the presence of unreduced oxides of iron, so that in refractory ores its value as a desulphurizing agent is greatly diminished, while on the other hand, in easily reducible ores, the metal is soon formed and low sulphur pig is the result. Roasted spathic ores are particularly favorable in this respect, because, being in their natural state a chemical combination of the carbonates of iron and manganese, the two metals are reduced simultaneously, the manganese has more time to act and a low sulphur pig results.

The temperature of the blast can be kept lower when making basic pig than is the case when foundry iron is made, as is indicated in the tables, and the remarks made when considering the manufacture of foundry iron concerning the relationship between this and the amount of slag hold good also for basic iron (compare analyses Nos. XV and XIX).

Table III.—Basic Iron (50 Per Cent. Soft and 50 Per Cent. Refractory Ores).

	XV.	XVI.	XVII.	XVIII.	XIX.	XX.	XXI.	
Iron.	3.95	3.63	2.45	2.12	2.70	2.80	2.48	
S	0.023	0.020	0.038	0.077	0.053	0.059	0.043	
Blast temperature, C.	700°	620°	620°	660°	600°	620°	630°	
Slag per 100 iron.	114	123	123	122	123	123	123	
SiO_2	40.88	38.94	42.15	40.06	41.82	42.04	41.22	
Al_2O_3	4.36	5.29	3.65	4.44	4.13	6.00	5.01	
FeO	0.66	1.18	1.05	1.05	0.91	1.05	1.84	
Slag.	MnO	5.79	4.04	7.15	4.78	6.41	7.96	6.76
CaO	38.27	40.46	36.36	42.12	36.88	33.72	36.92	
CuS	7.38	7.67	7.42	6.08	6.50	6.50	6.19	
MgO	2.03	1.37	2.61	1.56	1.94	1.22	1.30	

Comparing lime and manganese as to their efficiency as desulphurizers, it may be stated that when the amount of sulphur is large manganese is the more important; other things being equal, a lower blast temperature is necessary to pass the sulphur into the slag for basic than for foundry iron, and in the former case a furnace man is able to work with a less basic slag, facilitating the operation of the furnace.*

The most favorable conditions for eliminating sulphur exist when spiegeleisen is being made, as is shown in Table IV; the results given therein would have been still better if the blast temperature had been higher than 580 degrees C.

* While blowing in a furnace with coke and anthracite (containing together 2½ to 3 per cent. S) the author obtained at the first run of metal, with a slag which could be drawn out into long strings, a foundry iron with 4.5 per cent. Si, 1 per cent. Mn and 0.05 per cent. S, by means of adding a small amount of manganese ore when filling the furnace.

Table IV.—*Spiegeleisen (65 Per Cent. Refractory and 35 Per Cent. Soft Ores).*

	XXII.	XXIII.	XXIV.	Normal.
Iron. { Mn	25.45	27.70	21.20	
{ S	0.009	0.013	0.021	
Blast temperature, C.	630°	640°	580°	
Slag per 100 iron.	119	119	115	
SiO ₂	32.79	34.02	35.48	
Al ₂ O ₃	7.20	7.06	11.70	
FeO	1.31	0.53	1.17	
Slag. { MnO	18.13	21.19	11.94	
CaO	26.68	25.36	27.65	
CaS	9.90	8.53	8.91	
MgO	4.09	2.67	2.20	

High sulphur fuel (averaging 4 per cent. S) should therefore be used in the manufacture of spiegeleisen; if suitable ore is not to be had the manufacture of basic open hearth iron comes next in line, as this latter can stand a varying and even a high percentage of silicon. Only in the last resort should foundry iron be made, especially if the ores are easily reducible, because one obtains silicon in the pig even at a low temperature. This fact is important, since the gases are very rich in CO₂ by reason of the large amount of limestone used, and it is difficult to properly heat the stoves.

The height of the furnace is naturally limited, because the quality of the iron would vary too much with a large furnace. Of spiegeleisen the production can be 50 tons; of foundry, 100 tons, and of basic iron, 150 tons.

Launch of United States Cruiser "Chattanooga."

The cruiser "Chattanooga" for the United States Navy was launched on Saturday at the shipyards of the United States Shipbuilding Company, at Elizabethport, N. J. The vessel was named by the daughter of the Mayor of Chattanooga, Tenn. The "Chattanooga" is a sheathed steel protected cruiser. Her length over all is 308 feet 6 inches and 292 feet on the load water line. Her extreme breadth is 44 feet, draft 15 feet 9 inches and displacement 5200 tons. There are four steel decks and a deep cofferdam is built completely around the ship in the region of the water line. The cofferdam is filled with corn pith cellulose for the protection of the ship. There is a cellular double bottom the full length of the ship, and ten complete transverse water tight bulkheads extending above the water line. The pilot house and chart house are built of bronze and the water tight doors are operated from a central station.

The armament of the "Chattanooga" consists of ten 5-inch quick firing guns in the main battery, one each being located at the ends of the vessel on the main deck and four on each broadside of the gun deck. The secondary battery consists of eight six-pounder rapid fire guns, two one-pounders, with four machine guns and one field gun for landing purposes. The 5-inch guns of the broadside battery of the "Chattanooga" are protected by nickel steel plating 1 1/4 inches in thickness. There are two powerful searchlights on the flying bridge and the vessel is to have a wireless telegraphy equipment. Her bunkers can carry 700 tons of coal and at 10 knots her cruising radius will be over 5000 knots.

Smelters Win a Customs Case.

Judge Archbald, in the United States Circuit Court at Trenton, N. J., on March 3, rendered a decision in favor of the Guggenheim Smelting Company in their appeal from the decision of the Board of General Appraisers and the Collector of the Port of Perth Amboy. The case involved a large amount of customs dues. The decision hinged on the proper construction in the twenty-ninth section of the Dingley tariff act. That section, in order to encourage manufacturing in this country, provides that crude metal imported into this country for purposes of refining and the exporting of the refined article should be received free of duty. The Government contended that the company were bound to export a quantity of refined metal equivalent in weight to the crude metal imported. The case involved a good deal of discussion as to how much of the crude metal was wasted through the process of refining. Judge Archbald, however, decided that the Dingley act arbitrarily fixed 90 per cent. of the crude metal as the amount of refined metal that would have to be exported, and that no duty could be charged upon the remaining 10 per cent. of the crude metal, most if not all of which was waste.

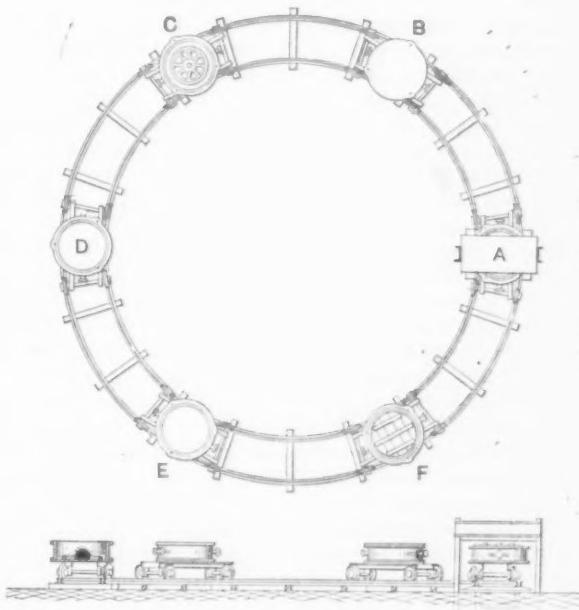
The Cross Molding Apparatus.

The molding apparatus designed by Edwin Cross of Burnham, Pa., consists of a circular track, upon which travel trucks. Those trucks are formed with a platform upon which the several operations of molding are performed as they move around the circle. For instance, at C the match plate with the pattern and flask on it is shown. At D the first molder puts on the facing sand and at E the flask is filled with sand. At F the ramming boards are placed on, and then the truck goes to the rammers at A, where the flask is rammed. At B the bottom plate is bolted or clamped and then the crane at this



THE IRON AGE

One Rail Segment.



Plan and Elevation.

THE IRON AGE

THE CROSS MOLDING APPARATUS.

point lifts off the flask and puts back the match plate on the truck, which is pushed to C, where the operations are commenced again. This method provides a certain definite task for each man, at which he becomes expert and keeps the machine in constant use.

The Lackawanna Steel Company have asked the Weather Bureau to establish a signal station at their plant at Stony Point and have received assurances that the request will be granted, owing to the large lake traffic the company will carry on in the transportation of ore, &c., and their immense investment along the lake shore. A steel tower for the display of signals will be erected at the southern end of the new breakwater and connected by telephone with the Buffalo office of the Weather Bureau. The Steel Company will supply a man to care for and operate the signal station.

Present plans contemplate the erection of six 200-ton open hearth furnaces for the Talbot continuous process at the Seneca works of the Lackawanna Steel Company.

Management in Industrial Competition.*

BY H. H. CAMPBELL, STEELTON, PA.

It is a common thing in America to smile over the non-progressiveness of our foreign friends and to congratulate ourselves that we are not as other men. There are many people here who believe that foreign engineers are not quite up to our standard, and that we are especially commissioned by Providence to illuminate the whole world with our spare energy. I will take away no glory from my fellow countrymen. They need no spokesman, and they will be sure to get all that is due them, as the progressiveness of American metallurgists and engineers is well known in foreign lands; but it is well to remember that there is one vital difference between metallurgy abroad and metallurgy here. The direct management of a steel works in America has practically its own way. If a mill is out of date and a new system of rolling or manipulation is needed, it does not take long to get authority to make the change. It is called extraordinary repairs, it is called improvement, or it is not mentioned at all. The directors leave much to the management; they feel that they pay men to attend to the operation of the works, and constant improvements are looked upon as necessary and inevitable. As for the stockholders, they are not considered, for a stockholder in America is not supposed to rise in meeting and question the wisdom of spending any reasonable sum upon improvement and then find out whether the improvement is paying for itself.

In England, especially, the very reverse is the case. The stock of many of the older steel works is very widely distributed, and large numbers of shareholders do not know anything about improvements and do not care. They want their dividends, and if any money is taken from profits and spent on new machinery, it must be fully explained why this was done, and it must be shown that this expenditure has been justified by results. If American managers had to go through such an inquisition whenever they proposed an improvement, and if, on the other hand, they could satisfy the shareholders by inventing nothing, it is possible they would lead a less strenuous life. . . .

The English manager has also to contend against very strong labor organizations, their ignorant and tyrannical control being a hopeless bar to the progress of English industries. There was a time when such societies regulated affairs in many American steel works, but it was soon discovered that progress and labor organizations do not sail in the same boat. This has lately been discovered in England, but it is not easy to fight against established customs. In the summer of 1899 I visited the Cleveland district of England. Everything indicated prosperity in the iron trade, and new work was under way that would add to the output and general business of the place. The firm in charge of this new plant stated that their boiler makers and riveters would work only three days in the week. Their wages had been advanced to offer extra inducements, but this did not help matters in the least, for by working hard and well during Thursday, Friday and Saturday these riveters were able to earn over \$7 per day, or \$22 in the week. When work ceased on Saturday evening a drunken carouse began, which lasted until Wednesday night. In a short walk through the streets of Middlesbrough on Monday forenoon I found at least a dozen men lying drunk upon the sidewalk—a condition which cannot be paralleled in any American city. It is impossible to reform this state of affairs, since the unions control the entire situation and do not consider any offense of this kind as ground for a discharge, and a strike would follow any attempt to interfere with the God-given right to get drunk once a week. . . .

In England there is a tendency to have the management of an enterprise descend from father to son, and this transference of power is often gradual, the son

being, perhaps, the assistant of his father for many years. It is evident that such a system tends to conservatism and the perpetuation of old conditions. This tendency is, of course, accentuated by the general sentiment of the country to know the opinions of older men and accept their decision as final. In America we bow to the decision, but we reserve the right to differ. . . .

Thus we have proved why, in many respects, our friends across the water do not keep pace with us in the race; but it remains to explain why, in many respects, they are ahead. It is not necessary to discuss the development of the Bessemer and open hearth processes, because when these methods came to light the iron industry in America was a small affair compared with the old established plants of Europe; but in the manufacture of coke, for instance, Germany has been using the retort oven for 20 years, while America has just discovered its existence. England was very slow in adopting it, owing to the opposition of venerable authority, but our country is the most behindhand in accepting the benefits of the invention.

In the matter of gas engines driven by blast furnace gas the Continent has completely distanced us. Engines have been operating successfully in France and Germany for four years, while long before this Riley, at Glasgow, in Scotland, put in operation an engine built by Thwaite, which has been running since 1895. Immense machine shops all over the Continent are busy turning out engines whose aggregate horse-power runs into many thousands, whereas in America nothing of any consequence has been done in this direction. Much of this forwardness in so using blast furnace gas arose from the fact that gas engines driven by illuminating and producer gas have been used much more extensively abroad. The visitor to any English city is struck with the puffing of these engines in the lumber yards and the cellars of numberless workshops, while in America this economical motor is little known.

In another respect the European works are ahead of American, and that is in the use of the unfired soaking pit. This practice is almost universal on the Continent and is common in England, while in America it has been a failure. This may be due to the fact that the rail steel here is much harder than abroad, for I found by inquiries in many different works that the unfired pit was not as successful with higher carbons. Moreover, in America it is the rule that nothing must interfere with the regular sequence of operations, and that if anything happens to the rolls, nothing else shall be behindhand when they are ready. It is evident that a gas fired furnace is more thoroughly under control and capable of holding ingots ready than one which has no supply of heat. The unfired pit is simply one example of a very important truth, which may be stated thus: A method, or device, or improvement, which is voted a success in Europe, will oftentimes be voted a failure in America if it gives the same results. In other words, we will not bestow upon it as much intelligent care as our German friends, and will not consent to the delays and interruptions which they regard as of little importance. This statement may be questioned by some persons, but there are many engineers of prominence and of experience who will agree with me in this broad statement.

America has developed along its own lines, but the lines on which England and Germany have worked have not been as capable of rapid development. In the Bessemer process England has faced a continually lessening ore supply, decreasing both in quantity and quality, and increasing in price. Immense progress could hardly be expected under such circumstances. Germany has had to adopt the basic vessel almost exclusively, and has been much more successful with it than any works in America. In rolling mills, our friends across the ocean have used generally the two-high reversing mill, and it is quite evident that the possibilities of expansion in amount of product with this system are less than with the three-high train.

This one item, the capacity of expansion, is the great dividing line separating European and American practice, and the reasons for the difference are not thoroughly appreciated. Taking the case of railroads for an illus-

* Extract from Chapter XXI of Campbell's "The Manufacture and Properties of Iron and Steel," published by the Engineering and Mining Journal.

tration, we have on this side of the water a new country. The lines that form a network in the older half have been built and equipped within the memory of young men. There were no old and obsolete patterns to copy. The new roads began with apparatus which to a greater or less extent was standard as far as America was concerned. The style of rail was practically uniform with all roads, and the amounts ordered by many railroads were enormous. One railroad would order 50,000 and another 60,000 tons for delivery in one season, and all rails were so nearly alike that it usually sufficed to change one set of rolls to go from one order to another. The differences in sections that did exist arose from a desire of the railroad engineer to experiment and get a better rail, although this sometimes resolved itself down to an egotistical desire to have his name associated with a particular design. This latter state of affairs in America seldom produces the kind of glory desired, and within the last few years a concerted action on the part of the steel manufacturers and engineers has resulted in the general acceptance of one set of standard sections.

In England the conservatism and importance of the railroad engineers render such standardizing apparently impossible. Not only that, but the use of chairs and their associated paraphernalia makes a change very expensive, while the much smaller mileage of their lines, due to geographical limitations, makes it impossible to have a very large order either for replacements or new track. . . . In America it is now possible to keep in stock the fish plates for the standard American Society sections. The rolls do not have to be put in for a few tons and taken out and put away for a year. The railroad engineer may think this matter of roll changes is no concern of his, but it is his concern, and his railroad must pay the bill in the end, and if the English railroads would unite on certain standard sections of rails and joints and abolish and forget certain details of inspection and testing that have come down from the dark ages and are perpetuated by the red tape of boards of trade, they would get their material at a much lower price, they would get it in half the time, and it would be just as good. The responsibility for these conditions, however, does not fall upon the English steel works. They have had to meet certain business demands, and they and the railroads are prevented from making any changes by the regulations of the Board of Trade, this latter institution being practically a Government commission whose hands are tied by Parliamentary legislation. All experience proves that progress is either slow or impossible when a legislative body has to be moved.

It is also to be borne in mind that England cannot extend her domain as the United States has extended, and that the increase in the cost of raw materials seems to put a limit upon future possibilities. Under these circumstances it would have been of doubtful expediency to build a counterpart of one of our immense American mills, for the total production of steel rails in all England is only about 800,000 tons a year, while in America a capacity of 600,000 tons is considered about right for one mill. England has, therefore, clung to the two-high reversing mill, which for smaller products has certain advantages. In the first place, it is much better adapted for rolling directly from the ingot, for with a reversing mill the bar can be backed out if there is a tendency to split. It also renders it easier to roll many different sections on one mill in steady operation, instead of having several mills, each adapted only to its own specialty, and it is also easier to make certain difficult sections on a two-high mill on account of the ability to vary the speed. . . .

In making the usual sections of structural material and railway splices, it is the custom in America to cut the ingot into several blooms or billets and reheat these for finishing, this being done in order that the bloom or billet mill shall run steadily at its maximum capacity. In Europe little thought is given to this argument. The question everywhere heard is this: "What could we do with all the steel if we should run continuously?" It is therefore much more common abroad than in this country to roll many different sections in one reversing

mill, the stuff being finished in one heat from the ingot, the finished bar being very long; in one mill a 2-inch square billet is finished 475 feet long and a 3 x 3 inch angle 425 feet. Oftentimes the finishing is done on a different mill, and frequently the finishing mill is three-high, the blooms being cut up and transferred without reheating.

The Germans use many three-high trains for finishing, and these are often of large size and are run fast. In more than one place 15-inch beams are rolled directly from the ingot without cropping the ends and without reheating, the work being done by hooks and tongs without any machinery except a steam cylinder to raise the swinging support of the hooks used to catch the piece. Such a lifting motion is necessary when the rolls are 30 inches in diameter and the mill runs 110 to 120 revolutions. I have seen a mill of this size and speed handling 8-inch blooms weighing about 1200 pounds, and few American workmen would care to work as fast and as hard as these hookers, although American workmen would have smiled at the idea of a man being able to do anything when wearing wooden shoes. In rolling beams by hand in a train of that size an army of men is required, and the average visitor can hardly understand why some simple labor saving devices are not introduced. It is related of an American at a German works that he offered to spend a certain reasonable sum in machinery and save so many dollars every month. The manager answered by showing him the cost sheets and proved that the total expenses for labor in the mill did not equal what he proposed to save. Such an answer, however, cannot possibly be true of all places where labor is thrown away. In one of the famous steel works of the world are two blooming mills, three-high, and exactly alike, turning out a combined product of 10,000 tons per month. In America one such mill would take care of from 40,000 to 60,000 tons per month, and two men on each turn would operate it, while in this place it took 14 men on each mill. The fundamental difference was that the table rollers were not driven, and it would be safe to say that the introduction of machinery to drive those rollers would have paid back the money every three months, to speak moderately.

It will not do, however, to suppose that the management was entirely contented with this condition. On the contrary, plans were drawn for an entirely new works, which involved immense expenditures of money, and it seemed to be the accepted law, not only at this particular works, but elsewhere, that an old plant should not be improved when a new one was contemplated. The reasons for this are, of course, self evident, and must have force everywhere; but in America such improvements do go on constantly even under exactly those conditions, because with our high priced labor and almost unlimited demand for steel it is often easy to pay for new apparatus in a year, while in Germany, with cheap labor and a much smaller product, it would take a much longer time. At another works, in another district, there were four mills under one roof, the building being large enough to cover all the room necessary for handling and shipping the product of all the mills, making it one of the largest buildings in the world. The total output of these four mills was about 400 tons each 24 hours. In America the same outlay would be expected to produce from five to ten times that amount.

This condition, however, is not universal, and the American visitor will find other plants more to his mind. It is impossible to obtain the same output from a basic converter that can be obtained from an acid lined vessel, as the addition of the basic materials, the greater amount of oxidation to accomplish and the much greater wear of the linings render it out of the question. Nevertheless there are several German works, among which may be mentioned Rothe-Erde, Phoenix, Hoesch and Hoerde, which can make from 32,000 to 35,000 tons of steel per month from a plant of three basic converters, ranging from 11 to 18 tons capacity, and there is no need to say that this cannot be done without an all sufficient supply of "push."

The diversity of product in a German mill and the intermittent work arise oftentimes from the universal

control by syndicates of all the items of production, and there is no incentive to rush out a heavy tonnage for a week and then shut down with an empty order book; but it would seem difficult to ever get a mill up to its maximum output and efficiency with workmen who wear wooden shoes. It would be good business to pay for a leather outfit simply for the moral effect. . . .

Much of the difference between the two sides of the Atlantic is due to the fact that no spirit of rivalry has even entered into European steel works. Men do not go from one place to another; they do not brag of outputs; they do not challenge every one to enter the race. It is beyond question that many of the great advances that America has made have been due almost wholly to vainglory and a simple desire to "beat all creation." Another factor was the desire to increase outputs when the margin of profits justified the most lavish expenditure, and it is doubtful if in every case it was foreseen that these outlays would result in such a great decrease in the operating cost per ton. In foreign countries this argument of beating a competitor has absolutely no place. In one of the old works in Germany there are blast furnaces in operation which are only 48 feet high, but as they are running on a fuel consumption of from 1790 to 1840 pounds of coke per 2240 pounds of iron the management sees no possible justification for destroying the existing plant and starting in on a new construction involving immense expenditures. The facts that the furnaces are out of date, that they are slow, that they are curiosities, have no bearing on the matter at all, and are not considered for a moment. In our country we might keep such furnaces if we had no money to build others, but we would apologize for them; we would say they were not worth looking at; but in Germany this sentiment is entirely unknown. It is open to debate whether a little of the foreign spirit would not be as valuable an acquisition for the American as a little American spirit is valuable for the European.

In America we enter contests from the time that we are born, and we always play to win. Europe does not know this feeling, and she will not make 2000 tons of rails in a day from one rail mill until she requires it. She has engineers who are as bright and smart as any in America; they are as progressive as any of our nation; they are working along many lines; they are introducing many labor saving devices; they are building mammoth mills and great machine shops; they are not narrow; they are copying America where America is good; they are filling their machine shops with American tools, and they are taking a fresh start. In Austria a great transformation scene is in progress. A syndicate controlling most of the iron and steel works of the kingdom is dismantling and abandoning most of them and concentrating the work into a few plants, which are being reconstructed and rebuilt with a thoroughness that we egotistically think is American. In Germany individual works are doing and have done the same thing, but in Europe these improvements are not always announced to the world with a flourish of trumpets.

There is a district in Germany which is said to possess financial advantages over any other, and the question is naturally suggested why the works at that place do not expand and monopolize the business. There are two answers, each of which is deemed sufficient in Germany. First, it would be difficult to get the necessary labor to move to a new place. Second, there is no inducement for the stockholders to spend money, as they are quite satisfied with dividends at the rate of 75 per cent., and there is no use of exhausting ore to pay dividends to new capital. These two reasons are equally incomprehensible to Americans; they represent the difference between Europe and America. Each land has much to give to the other. Perhaps we can teach them how to work, but they can teach us how to save up just a little of our surplus energy and use it in enjoying the fruits of labor.

One of the great improvements to the Homestead plant of the Carnegie Steel Company rarely referred to is the great hydraulic forging press which the Bethlehem Steel Company are now building. It will be of the same power as the great press at Bethlehem.

Lake Iron Ore Matters.

Activity in Exploratory Work.

DULUTH, MINN., March 7, 1903.—The increase in exploratory work on the Minnesota ranges is a marvelous matter. It is scarcely realized by even those that are intimately connected with it. It seems that as opportunities for exploration grow more and more limited the work increases in volume and intensity. It certainly increases in thoroughness and accuracy, as well as in cost. The price of the best black diamonds, the only quality available for use in this region of hard and severe drilling, is steadily rising and is now \$60 per karat. During the South African War it dropped off, on account of the lessened demand for stones from that important district, to about \$40 to \$42, but has been rising since then without a break. A single set of good stones, used for one bit, may now cost from \$1500 to \$2000, making the equipment for drilling a very expensive affair. One contracting firm in this district is carrying a stock of stones worth not less than \$70,000. The maintenance of an outfit of diamonds is a pretty costly item, when the constant wear, the occasional breakage and the not infrequent loss of an entire bit in some deep hole, where recovery is impossible, are considered. There are many costly bits or single stones buried hundreds of feet underground in this district, utterly beyond reach. One drill contracting firm in this district have just given an order at one time for four large diamond drills and 12 churn drills, increasing the number of their machines to considerably more than 100. Another firm have been buying an average of at least one of the heaviest diamond drill machines per month for the past two years in addition to many less expensive machines. Neither of these firms is taking half the work offered, and there are probably a score of smaller interests operating drills on their own accounts and for their own explorations. With the advent of spring and the increase of interest in some reputed new fields the number of these individual operations will materially increase. There are probably not less than 270 drills working on the Mesaba and Vermillion ranges at this time. Probably 100 feet per month will be a fair average for not too hard ground for each engine, and the contract cost of this varies from \$3 to \$6 per foot, according to the character of the drilling. Not less than 800 men are engaged in this work.

Early Opening of Navigation Expected.

Last year the first ships of the Pittsburgh Steamship Company left winter quarters in Duluth to load ore at neighboring docks on March 29. This was the earliest opening on record. It looks very much as though that experience was to be duplicated this season. Ships of the first class owned by this company—that is, steam vessels of the type of the "Morse," "Gates," "Harvard," &c., carrying from 6000 to 7500 gross tons—are nearly ready to move, and there is almost no obstacle in their way. There is ice in the harbors and connecting channels, but this is thin and will go quickly, and there is no ice in the open lakes. Lake Superior is entirely free. Ore hauling by upper lake roads will begin in a small way this month, if the weather permits. With an opening a month earlier than usually figured the capacity of the lake fleet is increased about 12½ per cent., a very important fact in connection with the contemplated 30,000,000-ton movement. Ships of the second class belonging to the Pittsburgh Steamship Company are now being outfitted, and will be ready in about a month. After a trip of the big steamers the barges will be brought into service, and the season will be in full swing. There is little in prospect now from American ports but ore and coal; the grain movement probably will be light on the present crop. But grain has lost the significance as a determining factor in the lake freight situation that it held up to a short time ago. The ore movement preponderates so overwhelmingly that nothing else counts. Lumber, which will be in larger tonnage this year than ever before, is carried by a class of vessels that is distinct and cuts into ore but slightly. Duluth and environs last year shipped to lower lakes, by the way, about 400,000,000 feet of lumber, the largest amount by far ever sent from any port, but less than the same district will ship this season. Coal will be shipped west in greater volume than before, but iron ore will form at least 75 per cent. of the traffic of Lake Superior.

Dock Improvements.

Dock improvements under way and decided upon by the Steel Corporation and others will make it possible to handle the season of 1904 not less than 20,000,000 gross tons from the head of the lake, should so much be required and should dispatch be rapid, so that upper lake dock facilities are ready for a number of years without further betterments. No. 3 Dock of the Duluth, Missabe & Northern road will be extended 1180 feet to a total length of 2330. It is one of the highest docks on the lakes, with a height of 67.5 feet. It will have capacity for 80,000 gross tons storage. The new Great Northern dock will be ready in June next. It will be 73 feet above water to the deck on which trains will move. Improvements to the Duluth & Iron Range dock consist of repairs only and the extension of Dock No. 3.

The United States Steel Corporation are erecting two very large ore crushing plants at shipping ports, one at Two Harbors and the other at Escanaba. Both will be in readiness this summer, and both will crush ore that has in the past been handled at the mines.

Active work in lifting the Penobscot pumping plant, noted in this correspondence some weeks ago, is now begun. The Minnesota Iron Company have gathered at the mine a very complete equipment and crews under their best master mechanics, so that the work, once begun, shall not be interrupted a moment. It is considerable of a task, calling for the highest skill and the promptest work, to take out these pumps. The plant will be placed on the Menominee range. These pumps are 310 feet down, and have been hoisting 4500 gallons of water per minute.

Death of Samuel Peck.

Samuel Peck, one of the old and well-known settlers of the Marquette district, is dead at his home in Florida. Mr. Peck was a link between the present feverish activity in the iron regions and the commencement, for he was the first man to ship ore regularly from Lake Superior. It was in 1855 that the old "plank road" was built by Mr. Peck, running from the Jackson mine at Negaunee to the lake at Marquette, and over this shipments were then commenced. S. L. Barney, still a dweller at Marquette, shipped the first cargoes from the region. In the winter of 1850-51 3000 tons of ore were quarried from the Jackson pit and hauled on sleighs to Marquette. Most of this ore was sent down lakes in the summer of 1851. Nothing more was done until Mr. Peck had completed his plank road and commenced hauling ore down in 1855. This was the year of the completion of the original Sault Canal. The first ore was taken from the Jackson pit in 1846, and smelted in a small bloomery a few miles distant. For the ten-year period ending with 1860, and including these first shipments, the total lake ore sent out was 178,676 tons, a small product to-day for a single little mine.

Improvements at Mines.

At the Republic mine, Marquette range, they are to replace most of the machinery plant with new and more modern equipment. Included in this will be new steam hoisting plants, new water power for compressors, new and larger compressor plants, remodeled shafts and a concentration of work by the abandonment of shafts and a rearrangement of surface equipment.

The new deep shaft at Savoy mine has been completed and is being tested, with its 165-foot steel head frame. The new steel lined shaft at Pioneer is bottomed and connections will be made with the workings in about six weeks. The new big shaft at Zenith is going down very fast and is now 225 feet deep. The Savoy's duplicate at Sibley is going down steadily, though not pushed. All these are at Ely, on the Vermilion range, and average little more than $\frac{1}{4}$ mile apart, an interesting indication of what is below them all.

D. E. W.

At the meeting of the National Association of Blast Furnace Workers, held in Youngstown, Ohio, recently, action was taken looking to the placing of the blast furnace workers in the Ironton and Columbus, Ohio, districts on a basis with the craft in the Mahoning and Shenango valley and Buffalo districts. It is claimed that the blast furnace workers at Columbus and Ironton are paid lower wages than in other districts.

P. C. Goble.

Palmer C. Goble, head of the Chicago sales department of the Jones & Laughlin Steel Company, died suddenly at his residence in Chicago, on Monday, March 2, aged 63 years. Mr. Goble, who for 24 years had been connected with the Jones & Laughlin Company, was at his desk as usual in the morning, but about 1 p. m. went home, where he died late in the afternoon, his death being due to neuralgia of the heart.

Mr. Goble was a native of Michigan, having been born at Monroe September 18, 1839. His boyhood days were spent in Ohio, where he received a liberal education. He removed to Chicago in 1854 and entered the employ of H. W. Austin, dealer in heavy hardware. Some years later he was one of the organizers of the firm of Kirk, Goble & Mendson, heavy hardware merchants. Later the business of this firm was merged with that of Kelly, Maus & Co. In 1879 Mr. Goble be-



P. C. GOBLE.

came connected with Jones & Laughlins and has since been continuously with that firm. Few men possess a more thorough knowledge of the details of the iron and steel trade than he had acquired during his long experience. This special knowledge was constantly being drawn upon in the management of his important department and was imparted with an unfailing courtesy which won the lasting friendship of all with whom he came in contact. He is survived by his widow, two sons and four daughters.

The statement is made that in Massachusetts last year four times as many passengers were carried by electric cars as on the steam roads. Of course that was due chiefly to the dense city traffic, but still the city street car systems were pretty complete seven years ago. The trolley passenger business, however, has doubled since that time, while the steam passenger business has actually declined. The electric mileage of the State has increased by from 9 to 18 per cent. every year since 1894. In 1901 the increase was 242.7 miles. In the same year the length of steam lines was reduced by 1.39 miles.

The February fire loss of the United States and Canada, as estimated by the New York *Journal of Commerce*, shows a total of \$16,090,800, making a total for the present year of \$29,257,000, as against \$36,000,000 for the first two months of 1902, and \$30,566,000 for the corresponding period of 1901.

Notes from Great Britain.

The Markets and the State of Trade.

LONDON, February 28, 1903.—A more cheerful feeling has prevailed this week, owing in no small degree to reports from the northeast coast that large American orders have been received for early shipment. The upward jump of Glasgow warrants, with the correlative increase in Middlesbrough prices, was very gratifying to pig iron makers. The buyers who have been holding off with such skillful pertinacity promptly began to buy and to cover future requirements, when they saw that the market was hardening. Smelters generally are more hopeful in consequence and have been less inclined to press for sales. I think, however, that this feeling is quite transitory. That the general situation is not good is evidenced by a letter written by one in the trade, from which I quote in part. This gentleman says:

"In view of the continued serious depression in this industry, caused principally, there is little doubt, by the tactics of the buyers, who are holding back business in a bold attempt to rule prices to their own satisfaction, and who are aided by the desperate efforts of some of the larger iron makers to keep their works going even though it be at a known big loss, is it not opportune at the present moment to ask the trade generally to consider the advisability of forming district associations with a view to checking the appalling drop in prices and to co-operate in obtaining fair value for their goods?"

The week's prices have hardened. Scotch warrants which last week were 53 shillings 9 pence are this week 57 shillings 3 pence, while Middlesbrough has gone up from 47 shillings 3 pence to 51 shillings 2 pence. Hematite west coast warrants also advanced from 58 shillings 6 pence to 60 shillings 3 pence. Other prices are as follows:

Pig Iron: Scotch, 57 shillings 3 pence; Middlesbrough, 51 shillings 2 pence; hematite (W.C.), 60 shillings 3 pence. Forge qualities: Staffordshire cinder, 49 shillings; part-mine, 49 to 51 shillings; all-mine, 57 shillings 6 pence to 67 shillings 6 pence. best ditto, 80 to 85 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 48 to 50 shillings; Derbyshire, 50 to 51 shillings; North Staffordshire, 51 to 52 shillings; Lincolnshire, 53 shillings 1 penny.

Public stores stocks, February 26:	Tons.
Connal's, at Glasgow.....	20,771
Connal's, at Middlesbrough, hematite.....	1,300
Wednesday, February 25:	
Hematite, West Coast.....	22,503
Connal's, at Middlesbrough.....	131,610
Tuesday, February 24:	
Hematite, West Coast.....	22,503
Connal's, at Middlesbrough.....	131,243

Finished Iron: Marked bars, £8 10s.; common unmarked bars, £6 5s. to £6 10s.; North Staffordshire bars, £6 15s.; angles, £6 10s. to £7; sheets, singles, £7 7s. 6d. to £7 12s. 6d.; doubles, £7 10s. to £7 15s.; trebles, £8 2s. 6d. to £8 7s. 6d.; galvanized corrugated sheets, f.o.b. Liverpool, £11 2s. 6d. to £11 7s. 6d.; hoop iron, £7 5s. to £7 10s.; nail, rod and rivet iron, £7 5s. to £7 10s.; gas strip, £6 15s. to £6 17s. 6d.

Steel: Bessemer billets, £4 12s. 6d. to £4 17s. 6d.; Siemens billets, £4 15s. to £5; mild steel bars, £6 10s. to £7; steel plates, £6 5s. to £6 15s.; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 5s.

Agents of Belgian and German firms in the Midlands this week stated that they were completely off the market. The difficulties of galvanizers are increasing by the continued stringency of spelter (G.O.B. £21 12s. 6d.). The increase has forced them to demand more for sheets, but consumers are not disposed to follow, and business is in consequence quiet. The only change that I observe in the steel trade is that Scotch makers have raised their quotations for ship plates 2 shillings 6 pence per ton. Some producers are now firm in their price at £5 15s. per ton, less 5 per cent., but others might accept £5 13s. 9d. This slight improvement is due of course to the higher price being asked by pig iron makers for hematite. Angles are still £5 7s. 6d. per ton, less 5 per cent., and boiler plates £6 5s. to £6 10s.

Copper continues its upward career, the price at the present moment being kept up by the encouraging character of reports as to the consumptive demand.

The Tin Market.

More than usual interest at the present moment centers around the tin market. Your readers are doubtless aware that a sharp advance has taken place during the

last few months. The leading interests, who were formerly bears, have now changed their tack. The question is, why is this? A general survey of the trade leads to the conclusion that on the whole consumption is fully equal to, if it does not actually exceed, the supply. The increased use of antifriction metal, the increasing demand in American tin plate quarters, the increased use of solder of all sorts, in addition to the ordinary trade demand, indicate that the price may continue firm for some time to come.

It is the statistical position which is so puzzling, but even available statistics point to the world's consumptive demand materially growing in excess of current supplies, and an encroachment upon reserve stocks is in the highest degree likely. The consumptive purchases in 1902 statistically at least outstripped supplies by 2000 tons. Since the termination of the great strike America has proved an exceptionally good customer, and the bulk of arrivals in London during the last six weeks have been shipped across the Atlantic without delay. The stock in warehouse here fell below 4000 tons by the end of January. In addition several large buying orders given out on the London market have been shipped to the United States direct from the Straits. The clearances from that quarter show that the returns for January have been exceptionally heavy.

Another factor in the stiffening of the price is that mining operations and transport facilities in the Straits are reported to have been curtailed by floods, and it is generally expected that only moderate shipments will be possible for a month or two. The high price of tin has not as yet stimulated the output, and judging by the returns for 1902 there would actually seem to have been a decrease. Another notable feature of the tin market has been the heavy speculation by Chinese dealers. The result of this is that the prices in the Straits rule considerably above London parity.

There is the usual difficulty in getting reliable estimates of the stock held in American private warehouses. It is speculation respecting the extent of this stock which leads to so much feverish activity among operators. As regards Banca tin, the reserve supplies at the mines have had, it is assumed, to be drawn upon for some time past, since the output has disclosed a marked decrease. Apart from Straits, Banca and Billiton, a fair quantity of Cornish and Bolivian tin, which are not included in the statistics, also goes into consumption. The stock of the latter description, which amounted a year ago to close upon 1000 tons, is said to have been practically absorbed.

Employment in the Iron and Steel Trades.

During the month of January employment in iron mining was practically the same as a year ago. In 119 mines and open works the average number of days worked per week was 5.55, compared with 5.53 a year ago and 5.76 in the four weeks ended December 20, 1902. In iron and steel works employment has declined somewhat as compared with December, and is worse than a year ago. At 201 works covered by available returns 73,589 work people were employed in the week ended January 24, a decrease of 1306 compared with December and of 3811 compared with January last year. The average number of shifts worked per man was 5.28, compared with 5.34 in December and 5.31 in the week ended January 25, 1902. In the tin plate works employment continued good throughout January.

The state of employment in shipbuilding was much worse than a year ago, especially on the Northeast Coast. The percentage of unemployed was greatest in the Tees and Hartlepool district, 27.5 per cent.; on the Wear, 25 per cent.; on the Tyne, 16.8 per cent. Those districts least hurt by bad trade were Barrow, 0.4 per cent.; Belfast, 3.4 per cent.; the East Coast of Scotland, 3.5 per cent., and the South Coast of England, 3.9 per cent. In the engineering trades the unemployment at the end of January was 5.6 per cent., compared with 6.6 per cent. at the end of December and 5.2 per cent. in January, 1902. The engineering trades would of course to some extent be affected by the depression in shipbuilding, but on the whole trade in engineering circles, while not bad, is distinctly quiet.

Another Extension of Charles Cammell & Co.

Shareholders in the firm of Charles Cammell & Co. received last Thursday a circular from the secretary, intimating that arrangements have been made to acquire the business of the Mulliner-Wigley Company, Limited. The firm are largely engaged in the manufacture of gun mountings at their engineering works in Coventry, in addition to their well-known carriage business, which is carried on chiefly in Birmingham. No official intimation as to the terms of purchase has been made public, but I understand that the purchasing company will pay to the preference share holders in cash the par value of their shares, as they have power to do under the articles of association of the Mulliner-Wigley Company. The vendors hold the whole of the ordinary shares, and these will be taken over by special arrangement. The capital of the Coventry firm is £90,000, consisting of £40,000 in 6 per cent. preference shares of £5 each, £30,000 in 10 per cent. preferred ordinary shares of £1 and £20,000 in ordinary shares of £1. For the year ended 1901 the net profit was £40,231. The ordinary shares received a dividend of 20 per cent. and a bonus of 24 shillings per share. There is a reserve fund of £15,000.

Steel Works in Kent.

More than a year ago I informed readers of *The Iron Age* that there was an intention to lay down steel works in Kent, hitherto entirely an agricultural or residential county, with the exception of naval mercantile engineering carried on at some of its ports. These steel works are at Stroud, near Chatham, on the banks of the Medway, and are owned by the Medway Steel Company, of whom Douglas Vickers is the chairman and G. P. Wilson, who was formerly with Charles Cammell & Co., is the managing director. Castings are to be the principal product, and to begin with the weekly output will be about 100 tons of steel. It is intended, however, considerably to extend the plant in the near future. All the machinery is of the latest type and electrically driven. W. E. Messner of Winterthur, Switzerland, has been appointed manager.

Output of Coal in 1902.

The Home Office Department has issued advance proofs, subject to correction, of tables relating to the output of coal and of the other minerals, and the number of persons employed at mines during 1902. The output of coal, which was 219,037,240 tons in 1901, was 227,178,140 tons in 1902, showing an increase of 8,140,900 tons, or 3.72 per cent. This increase was distributed in the 12 inspection districts as follows: East Scotland, 826,621 tons; West Scotland, 538,963 tons; Newcastle, 783,484 tons; Durham, 489,050 tons; York and Lincoln, 990,259 tons; Manchester and Ireland, 415,021 tons; Liverpool and North Wales, 306,498 tons; Midland, 1,338,298 tons; Stafford, 310,408 tons; Cardiff, 960,868 tons; Swansea, 558,602 tons; Southern, 613,828 tons.

The number of persons employed at mines was 825,401, an increase of 18,666, or 2.31 per cent.

Some Interesting Dividends.

W. T. Henley's Telegraph Works Company, Limited, report a profit for the year 1902 of £61,362. After the usual payments and usual allowances for depreciation, &c., there remains £53,557, plus £26,785 brought forward, giving a total of £80,342 for distribution. A dividend at the rate of 20 per cent. per annum is being paid, and £25,967 carried forward.

Crossley Brothers of Manchester, so well known for their gas and oil engines, report a net profit of £90,200, or £3000 in excess of that for the year 1901. Bearing in mind the shrinkage of trade last year, this is really astonishing. The dividend rate is 11 per cent., and £19,600 is carried forward.

A few weeks ago I had occasion to comment upon the firm of Mather & Platt, who were the first in this country scientifically to test the utility or otherwise of the eight-hour day. The company have been so successful that they are increasing their authorized capital from £775,000 to £1,000,000. There are two reasons for this, the first and most important being the increase in the company's business, and the other as a natural corollary, the building of large new engineering works at Newton Heath near Manchester,

Vickers, Sons & Maxim are declaring a dividend of 12½ per cent. for last year. The Leeds Forge Company report a profit of £96,334, which, with £20,639 brought forward, leaves available for distribution the sum of £116,973. The report recommends that £18,000 be taken for redemption of funding certificates, £1500 for directors' remuneration, £25,000 for reserve account, and £20,000 for land, buildings, patents, &c. With the residue a dividend on ordinary shares at the rate of 7 per cent. is declared, and £22,903 carried forward.

The annual meeting of the shareholders of Henry Bessemer & Co., Limited, was held last week. The report and balance sheet disclosed that the net profit for the year was £11,538, as compared with £16,394 during the previous year. Although profits went down, the turnover of the company exceeded that of the previous year by over £1,000. The loss in profits is due to raw materials, more particularly hematite irons, the price of which has been out of proportion to the selling price of the finished material. This state of things is attributed by the chairman of the company to the inflated prices caused by the big demand from the United States. A dividend of 7½ per cent. for the year was declared.

A Growing Port.

For many reasons it is probable that Manchester will become the natural receiving port of American raw and manufactured products. It is one thing for passengers to alight at Liverpool, but it is in many respects better for goods to come up the Manchester Ship Canal. That this is the tendency can easily be gathered by the increase of traffic and revenue of the canal. The weight in tons of toll paying merchandise which passed through it during the last six months of 1901 and 1902 was as follows:

	1901.	1902.
Sea borne traffic.....	1,422,083	1,679,825
Barge traffic.....	129,155	147,871
Totals.....	<u>1,551,244</u>	<u>1,827,696</u>

By way of showing the growing popularity of Manchester as a port, the following figures show the extent of the trade done since the canal was opened for traffic:

Years.	Tons.	Years.	Tons.
1894.....	925,659	1899.....	2,778,108
1895.....	1,358,875	1900.....	3,060,516
1896.....	1,826,237	1901.....	2,942,393
1897.....	2,065,815	1902.....	3,418,059
1898.....	2,595,585		

It may be remarked that the Manchester authorities are still pushing forward with new docks and more perfect arrangements in every direction.

A Striking Instance of Mining Royalty.

Mention of tin in the earlier part of this letter brings to mind the result of the well-known Cornish tin mine, the Dolcoath. The annual report of this mine is now being conned by its shareholders with anything but lively feelings of satisfaction. The more ore there is produced from the mine, and the greater the economy exercised, the worse the position appears to be. Thus, though 4320 more tons of ore were treated during the past half year than in the corresponding half of 1901, though the price of the tin sold was £4 0s. 10d. better than then, and notwithstanding that the working cost per ton was the lowest on record, the net profit for the half year is less by £4235 than that for the corresponding half of 1901.

The anomaly is due to a mysterious deterioration in the quality of the ore yielded by the Dolcoath since the company took over the working of the mine on the royalty system. As a matter of fact, the yield per ton of ore in tin is less than half what it was seven years ago. While the result of the past half year's operations is the obliteration of net profit by amounts written off for depreciation and development, and there is an absence of dividend for the whole year, the lord of the mine has received the handsome sum of £8791 for 1902 as royalties. It is not surprising that the directors of the company want to come to another arrangement with the lord of the manor. It certainly is an anomaly, to put it mildly, that the owners of the mine get nothing, and yet pay this large sum for the mere right to work it.

S. G. H.

The Donora Plant.

One of the largest of the new enterprises in iron and steel manufacture created in the Central West in recent years is the Donora Works of the Union Steel Company, who, with their affiliated companies, convert their own raw material, ore and coal into finished products, covering nearly the whole range of the wire industry. The plant proper is located on the Monongahela River at Donora, Washington County, Pa., a town created by the enterprise. When a start was made in the summer of 1900 there were only two farm houses on the tract. Now Donora is a well planned town with over 5000 inhabitants, to which further additions will be made as the works are completed. The Union Steel Company possess a level tract of 300 acres, well above the Monongahela River, on which it fronts for $2\frac{1}{2}$ miles. The property is flanked by the Monongahela division of the Pennsylvania Railroad, connection being effected by the Donora Southern Railroad, organized by interests identified with the Union Steel Company. The Donora Southern Railroad proposes to build a bridge across the river to connect with the Pittsburgh & Lake Erie Railroad, which occupies the opposite bank of the Monongahela River. Being located within the 50-mile limit, Donora enjoys Pittsburgh rates of freight. The Monongahela River itself permits of shipment of products to all points reached by the Ohio and Mississippi rivers, and is one of the great channels for the shipment of coal, so that supplies of fuel will be drawn in that manner. Near the open hearth building there is a coal discharging plant to take advantage of these opportunities. Shipments by water of finished product are provided for by an inclined plane located near the warehouses. This is so designed that the loaded cars descending to the river craft will draw up the empties. The Donora plant is self contained as to raw materials. An identified interest, the Donora Mining Company, own in fee the Penobscot mine and have leases on the Sweeny and Donora mines on the Mesaba range. The Donora Mining Company also own two modern ore vessels. The Donora Works also own in fee under the title of the River Coal Company 1200 acres of coal land in the fourth pool. This coal is to be shipped to the mill by water, but, of course, may also be received by rail, the company owning 90 steel cars of modern capacity. An additional fuel supply is available in the form of natural gas. There are on the property two gas wells, while an additional supply may be obtained from adjacent mains of a gas company. The Union Steel Company started first with the finishing part of their operations. Ground was broken on May 29, 1900, and production was begun on September 1 following, with one of the rod mills furnishing the raw material. The second rod mill was started late in 1902. While thus the company have been in the market with finished products for more than a year, the plant for the manufacture of the raw materials is now under process of construction. It consists of two blast furnaces and a basic open hearth plant of 12 50-ton furnaces, with a capacity of 1200 tons per day.

The Rod Mill.

When the blooming mill is completed it will deliver direct to the rod mill. At the present time purchased billets are either stocked or are unloaded direct in the heating furnace building from the cars on a depressed track upon mill trucks, handled by an electric trolley for conveyance to the heating furnaces. Of these there are four, of the Laughlin continuous type. They are heated with natural gas from the wells on the property, but there are held in reserve five gas producers for an emergency. The heated 4 x 4 inch billets are delivered by rollers driven by a small engine direct to the roughing train of a double rod mill, designed by the Garrett-Cromwell Engineering Company of Cleveland, Ohio. The rod mill consists of a 16-inch continuous roughing train. This train, together with two stands of each of the 12-inch finishing trains, is driven by a double tandem compound Porter-Allen engine, built by the Southwark Foundry & Machine Company of Philadelphia. The engine has two 38-inch high pressure and two 75-inch

low pressure cylinders, with 60-inch stroke. A rope wheel 22 feet in diameter and 13-foot face drives the rope transmission through 59 2-inch ropes. The engine is also coupled direct by return crank on one side. Running at 75 revolutions per minute and 150 pounds steam pressure, the engine develops 8000 horse-power. There are two finishing trains, right and left, which consist of 12-inch rolls and of 9-inch rolls. Of these two stands of 12-inch rolls are driven from the main engine described. The others are operated by one engine for each mill. These two engines are of the cross compound Porter-Allen type, built by the Southwark Foundry & Machine Company. They have 30-inch high pressure and 60-inch low pressure cylinders, and 48-inch stroke and drive the trains through two three-ply 36-inch belts. At a speed of 100 revolutions with 150 pounds steam pressure they develop each 2500 horse-power. It will be observed therefore that the mill is exceptionally well provided with engine power. The mill produces 800 tons of rods per 24 hours. The rods are taken care of by six automatic reels for each mill and are dropped upon leaf conveyors 250 feet long, which elevate them to the workhouse level. One of these conveyors was furnished by the Link-Belt Engineering Company of Philadelphia and one by Heyl & Patterson of Pittsburgh. The wire rods are accumulated in a warehouse, 210 x 250 feet, so that the mill is able to run uninterruptedly on one size, while the wire mill can be supplied at all times with such stock as it is desired to use. A track running along one side of the warehouse permits of loading direct for shipment such rods as are to be placed on the market. Next in line, following the general plan of having the material in process of manufacture flow continuously from the raw material to the finished product in one direction, is

The Wire Mill.

This is housed in a building, amply lighted, like all the others, 800 feet long by 200 feet wide. The rods are first pickled in a group of seven steam heated vats arranged in a circle around a hydraulic jib crane. They are next dipped into a lime vat and are then suspended on a circular frame operated by a hydraulic cylinder, on which they are given a rust coating. A second complete set of these vats is available as a reserve. Then follow a line of 24 baking ovens, from which the rods emerge at once into the wire drawing room proper. This is equipped with 120 ripping blocks and 188 finishing blocks, with a daily capacity of 800 tons. They are arranged in six double rows. In a lean-to, 28 x 300 feet, are two Bates tandem compound engines, which drive the wire drawing machinery. Each of these engines has a 26-inch high pressure cylinder and a 48-inch low pressure cylinder, with 60-inch stroke, running at 60 revolutions per minute. They have a maximum capacity of 1500 horse-power each. One of the engines drives the ripping blocks and the other the finishing blocks. Each engine has a rope sheave, one line of main shafting on one side and two lines of shafting on the other side, to operate the double rows of blocks. All the dies for the wire drawing mill are forged in a special department by skilled operators, so that the wire drawers themselves confine their work to the one operation.

Galvanizing Building.

The wire galvanizing equipment is housed in a building 95 x 180 feet, and consists of four galvanizing frames, with lead annealing baths, each handling 12 wires simultaneously. This department has a capacity of 160 tons of galvanized wire per day.

The Wire Nail Mill

is a building 135 x 360 feet, and is equipped with 200 nail machines, capable of producing 5000 kegs of nails per day, with the entire range of nails. The machines are disposed in rows parallel to the center line of the structure. The nails are handled in trucks, which are lifted by an elevator to the charging platform of the cleaning room. In this there are seven 50-keg rumblers and four 15-keg rumblers, which discharge directly upon the general floor level, when the nails are loaded into kegs and are weighed. The kegs are delivered at this point by a chute from an overhead conveyor from the keg factory placed at the end of the plant. Close

Mnol

by is the assorting and packing department for such nails, &c., as are put up in small packages. Nearby is also the tool department for the nail mill. There are also provided two staple machines and wire straightening and cutting machines for pump rods, &c. The entire mill is heated by the Sturtevant system. Adjoining the nail mill on one side and the galvanizing mill on the other is the

Barb Wire Department,

in a building 66 x 180 feet. In this mill there are 50 barb machines, with a capacity of 125 tons per 24 hours. The power for the nail factory and the barb wire mill is furnished by a Bates-Corliss 28 x 48 inch engine, rated at 500 horse-power. By a series of overhead wire rope drives it operates the shafting from which the rows of barb wire machines, of nail machines and of rumblers are operated. Beyond the nail factory lie a series of buildings including a fire proof paint dipping shop. Here also is located the keg factory, the Union Steel Company manufacturing their own kegs and their own barb reels. The dry kilns for the lumber are in the lower floor of the building, whence it is taken by an elevator to an upper floor. From there the kegs are transported by an overhead conveyor direct to the packing department in the nail mill.

The Warehouse.

Parallel to the nail mill, with a depressed standard gauge shipping track on either side of it, is the large and roomy warehouse, 100 x 780 feet. In this there is also the annealing department, consisting of 15 annealers, fired with coal, and commanded by a 5-ton Morgan crane. It has a capacity of 70 tons per day. In the same room is a coloring and bluing department. Parallel to the warehouse there is now being built a fine wire mill, in which it is proposed to manufacture the whole line of fine market wires, including tinned and other wire. Beyond the property of the Union Steel Company there are the works of the Mathews Woven Wire Fence Company, who manufacture woven wire fencing with specially designed machinery, which will permit of turning out product at a low cost. The plant of the Union Steel Company also includes a number of auxiliary departments. Among these is a pattern shop, driven by motors, in which the boxes for packing certain sizes of nails are also manufactured. It may be of interest to mention in this connection a neat system of getting rid of the troublesome sawdust. It is delivered to an oven heated with natural gas, in which it is completely consumed. There is also a blacksmith shop, commanded by an electric train, with its line shaft driven by a motor. In this shop there is concentrated also the whole work of tempering the tools for the nail machines, the dies, &c. The company also manufacture all their own tubs and tanks. One special machine shop is provided for the nail mill and another for the rolling mill.

The Boiler House

is particularly well equipped. In a building 50 x 414 feet there are 18 batteries of Sterling boilers of 500 horse-power each, provided with Playford stokers. Coal is delivered from the cars into bins, from which it is elevated and distributed to the chutes of the boilers by a Heyl & Patterson crane system. The ashes are to be handled by motor cars and elevators.

The pump house contains three boiler feed pumps, two Epping & Carpenter pressure pumps, a hot mill pump and three 2,000,000-gallon Worthington pumps. There is also a Ribus rotary pump and a Southwark 15,000 horse-power Weiss central condensing system. The water is drawn from the river through an 8-foot tunnel to an intake, which is provided with three rows of screens. There is also a central electric station containing a lighting plant, driven by a Westinghouse engine and three 200-kw. Westinghouse dynamos coupled direct to 20 x 20 Porter-Allen engines. Among the isolated buildings we may mention also a furnace for busheling wire scrap. The works have a finely equipped office building, in which provision is also made for a hospital for first aid to the injured.

Philadelphia Foundrymen's Association.

The regular one hundred and twenty-sixth meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club, 1409 Walnut street, in that city, Wednesday evening, March 4. In the absence of the president Dr. E. E. Brown occupied the chair, and called the meeting to order at the usual hour. The following were in attendance:

Dr. E. E. Brown, E. E. Brown & Son, Philadelphia.
C. R. Brown, E. E. Brown & Son, Philadelphia.
A. D. Wallace, E. E. Brown & Son, Philadelphia.
S. B. Gibbons, J. Wesley Pullman, Philadelphia.
F. C. Pullman, J. Wesley Pullman, Philadelphia.
Jas. Duffy, Marietta Holloware & Enameling Company, Marietta, Pa.
H. P. Jackson, Harlan & Hollingsworth Company, Wilmington, Del.
Jas. McAnally, Harlan & Hollingsworth Company, Wilmington, Del.
H. Clifford Mills, Schaum & Uhlinger, Philadelphia.
H. L. Haldeman, Pulaski Iron Company, Philadelphia.
J. Thompson, J. Thompson & Co., Philadelphia.
J. H. Pepper, Brass Founder and Finisher, Philadelphia.
J. S. Hibbs, J. W. Paxson Company, Philadelphia.
Geo. C. Davis, chemist, Philadelphia.
H. O. Evans, Thos. Devlin Mfg. Company, Philadelphia.
A. A. Miller, *The Iron Age*, Philadelphia.
Frank Crook, Dixon Crucible Company, Philadelphia.
C. D. Matthews, Camden Iron Works, Philadelphia.
R. Audenreid, Pennsylvania Iron Works, Philadelphia.
Wm. Hanson, Pennsylvania Iron Works, Philadelphia.
Edw. Page, J. K. Dimmick & Co., Philadelphia.
H. W. Coleman, J. K. Dimmick & Co., Philadelphia.
H. C. Matlack, Frank Samuel, Philadelphia.
Thos. J. Kelley, Thomas, Roberts, Stevenson & Co., Philadelphia.
W. P. Cunningham, A. & P. Roberts Company, Philadelphia.
J. J. McCrystal, Girard Iron Works, Philadelphia.
David Riedenauer, I. A. Sheppard & Co., Philadelphia.
E. E. Durant, G. F. Warren Mfg. Company, New Haven, Conn.
O. J. Ward, Howe Scale Company, Philadelphia.
Howard Evans, J. W. Paxson Company, Philadelphia.
S. G. Flagg, Jr., Stanley G. Flagg & Co., Philadelphia.
Geo. Benkert, Williamson Bros. Company, Philadelphia.

Discussion on the subject, "Is it Wise at the Present Time and at Ruling Prices to Make Contracts for Supplies of Coal, Coke and Iron for the First Half of the Year," was continued from the last meeting. There was more or less diversity of opinion, each being based on the individual requirements of the various foundries. It was generally considered, however, that if any foundry had its product sold ahead, it would be wise to contract ahead, rather than to depend on possible reductions from the present prices. It was the opinion of some that conditions governing deliveries of raw materials would depend largely upon the ability of the various railroads to transport freight promptly, as many furnaces and mines had their capacity for the first half of the year already contracted for.

The feature of the evening was the reading of a paper, entitled "The Future of the Foundry Industry," by Dr. Richard Moldenke, secretary of the American Foundrymen's Association, which will be found in another part of this issue.

Considerable discussion followed the reading of the paper, but Dr. Moldenke was sustained in his various opinions. It was thought that the "three eight-hour shift" idea is quite practicable, but that a radical departure from the general arrangement and conditions in present day foundry practice would be necessary to bring about satisfactory results. In reply to a question as to whether the foundry trade was at its high or declining, Dr. Moldenke said that in his opinion we had passed the high-water mark, and at present were sailing on an even keel, in which condition the trade would probably continue for several years.

After tendering Dr. Moldenke a vote of thanks for his interesting paper the meeting adjourned, following which the usual luncheon was served on the Roof Garden of the club.

Word has been received from the headquarters in Cincinnati of the National Metal Trades Association that Buffalo has been selected as the place for holding the next convention of that organization, which is to occur March 30 to April 2. The meetings of the convention will be held at the Hotel Iroquois and the City Convention Hall.

Review of the Work of Congress.

WASHINGTON, D. C., March 10, 1903.—A brief review of the work of the session of Congress just ended will probably be of more than passing interest, especially for the reason that the fate of a number of measures of interest to readers of *The Iron Age* was in doubt up to the last moment and has not been recorded in the daily press.

Antitrust Legislation.

The so-called antitrust legislation of the session easily overshadows all other work accomplished. It may be briefly summarized as follows: 1, an appropriation of \$500,000 to enable the Attorney-General to execute the antitrust laws; 2, the creation of two new offices—namely, an Assistant Attorney-General and an Assistant Attorney to the Attorney-General, who are to have charge of the prosecution of antitrust cases; 3, the creation in the new Department of Commerce and Labor of a Bureau of Corporations, having authority to investigate all corporations doing an interstate business; 4, the enactment of a stringent law against the giving or accepting of rebates on transportation charges; and, 5, the enactment of a law to expedite the hearing of cases brought under the antitrust statutes.

The Administration has been prompt to put this new legislation in force. The President has already appointed Milton D. Purdy and William A. Day to the important offices just created and they have been confirmed by the Senate and have entered upon the discharge of their new duties. The Bureau of Corporations in the new Department has been organized, with James R. Garfield at its head and an appropriation of \$60,000 for salaries and expenses of special examiners to investigate interstate corporations has been turned over to the Bureau. The Attorney-General has already filed a petition in the Northern Securities case under the terms of the new law to expedite the hearing of antitrust cases, and the final disposition of this important controversy will be materially hastened thereby.

Bankruptcy Amendments.

A highly important piece of legislation was the passage of the so-called Ray bill amending the Federal bankruptcy law. This bill was urged by business interests in all parts of the country and in all industries and was designed to remedy defects in the Federal law developed as the result of several years of practical operation. The chief amendment was designed to meet the criticisms with regard to the operation of Section 57g of the old law, which had been held by the courts to require creditors receiving payments on account within four months of the filing of a bankrupt's petition to return such payments before being entitled to prove up their claims. Under the amended statute such payments need not be surrendered unless clearly shown to be preferences within the meaning of the statute.

Foreign Patents.

In the closing days of the session a bill was passed, referred to in another column, for the execution of the Brussels Agreement of 1900 with regard to foreign patents. By this bill the rights of the citizens of all countries subscribing to the agreement are made uniform in each country, and for the first time foreigners are permitted to file caveats in the United States Patent Office.

Railway Appliances.

On the eve of adjournment the Senate agreed to certain important House amendments to a supplementary act requiring common carriers engaged in interstate commerce to equip their cars with automatic couplers and continuous brakes and their locomotives with driving wheel brakes. As agreed to, the principal section of the bill provides that "whenever any train is operated with power train brakes, no less than 50 per centum of the cars of such train shall have their brakes used and operated by the engineer of the locomotive drawing such train, and all power braked cars in such train which are associated together with said 50 per centum shall have their brakes so used and operated."

Eight-Hour Bill.

The death of the eight-hour bill has already been chronicled in these dispatches. The signal defeat of this

measure—for its friends were not even able to bring it to a vote in the Senate—has discouraged the labor leaders from any attempt to bring it forward at the special session of the Senate now sitting, and it seems probable that nothing further will be heard of this measure until the eve of the new Congress, when it is likely to be presented in a somewhat modified form. The original House bill will hardly be reintroduced without amendment in view of the declarations in the Senate Committee's report as to its unconstitutionality.

The Tariff.

In spite of efforts made to bring them up for discussion, the Babcock tariff bill revising the metal schedule and a considerable number of minor measures providing for changes in the rates on various metal products were pigeonholed in the Ways and Means Committee. Contrary to the impression current at the beginning of the session, no arrangements were made by Congress for a joint inquiry into tariff matters during the recess, but, as heretofore stated in these dispatches, the Finance Committee has been authorized by special resolution to hold meetings to consider tariff and revenue questions. Should any measures be adopted by this committee, they would require to be presented first in the House.

The Lovering Drawback Bill.

Although Congress adjourned without acting on the Lovering drawback bill, the friends of that measure are not discouraged, and, in fact, feel decidedly hopeful that the measure will be passed next winter in view of the very lively interest which was finally aroused in the general subject of liberalizing the drawback laws among members of the Ways and Means Committee.

The Metric System.

The metric system bill is another measure which has attracted a great deal of attention, but which was not brought to a vote during the session just closed. The plan of the advocates of the measure will be to introduce it simultaneously in both Houses next December and to endeavor to secure favorable reports by both committees during the long session. The bill passing either House can then be substituted in the other and much time saved.

Fifteen-ton Launch Bill.

A measure of special interest to manufacturers of small gasoline and electric engines for use in launches, &c., was smothered in the closing days of the session. This bill provided that all vessels carrying freight or passengers propelled by gas, fluid, naphtha, or electric motors should be subject to the laws relating to the inspection of hulls and boilers and require engineers and pilots. The manufacturers of launches and engines resisted the passage of this bill on the ground that it was unnecessary and that its operation would be to prohibit absolutely the use of such small vessels, the business of which would not justify a compliance with the proposed law.

The Ship Subsidy Bill.

The failure of the ship subsidy bill, which passed the Senate early in the first session of the Fifty-seventh Congress, was due to the opposition of four Republican members of the House Committee on Merchant Marine and Fisheries, although some doubt has been expressed as to whether the bill would have passed the House in a form satisfactory to the Senate. Much speculation is being indulged in concerning the probable make up of this committee in the next House. Several of the opponents of the bill have been retired from Congress, but Representative Cannon, who as Speaker of the next House will fill these vacancies, is ranked among the opponents of the bill and is hardly likely to appoint a majority of pro-subsidy members. The bill will be carefully overhauled during the recess, however, and an effort will be made to so amend it as to command the largest possible measure of support in both Houses.

W. L. C.

We are officially advised that it has not been definitely decided by the New York Shipbuilding Company of Camden, N. J., to build a steel plant at Paulsboro, N. J., where the company own land.

Plans of the New Manhattan Bridge.

The commissioners appointed by the Mayor of New York to examine the plans of the Manhattan Bridge, to be erected across the East River, have made their report. The board is composed of George S. Morison, C. C. Schneider, Henry W. Hodge, Mansfield Merriman and Theodore Cooper. The report suggests no alterations and states that the bridge will be in accordance with the most advanced practice of suspension bridge designing. We take the following extracts:

Description.—The Manhattan Bridge will be a suspension bridge, having a central span 1475 feet long, between centers of towers, and two side spans of equal length, each 725 feet long, measured from center of tower to anchorage connection. Both central and side spans are somewhat shorter than the corresponding spans of the old East River bridge. The general design consists of four cables, supported by steel towers or bents, each cable being a steel eye bar chain, hanging in a vertical plane. The two center cables are 40 feet between centers, and the side cables 28 feet between centers, making the total width 96 feet between centers of outside cables. Each tower or bent consists of four vertical posts, one under each cable; these posts having pin bearings at the bottom, the pins being carried on metal shoes to distribute the weight properly over the masonry.

Although the design is a true suspension bridge, the method adopted for stiffening against irregular loads is by the use of trusses, of which the cable forms the upper member, instead of stiffening trusses at the floor level, as commonly used. Suspended from each pair of cables is a double track, double deck steel structure, carrying two elevated railroad tracks on the upper deck and two trolley tracks on the lower deck. The central space between the two lower decks is connected by a solid floor which forms the highway floor. Two footways are carried on brackets, extending out from each lower deck. This arrangement gives a lower floor 126 feet wide over all, at the center of which is a clear roadway, entirely open, 35 feet 6 inches wide between wheel guards, and at each side a footway, also entirely open, with a clear width of about 11 feet. The arrangement seems likely to prove satisfactory. We have no suggestions to make for its improvement.

Concerning the weight that could possibly be put on the bridge, this statement is made:

It would consist of a continuous train of rapid transit cars on each of the four elevated tracks, of a continuous line of trolley cars on each of the four trolley tracks, and a crowd of heavy teams on the roadway, and of a crowd of people on each footway. The estimated greatest possible congested weight per lineal foot on this bridge would be as follows:

	Pounds.
4 rapid transit trains, at 1700 pounds.....	6,800
4 lines of trolley cars, at 1000 pounds.....	4,000
33.5 feet of roadway, at 100 pounds per square foot.....	3,550
22 feet of footway, at 75 pounds per square foot.....	1,650
Total.....	16,000

The design contains three features which, though not properly novel, are departures from the more common practices with suspension bridges; they are the cables, the stiffening trusses and the metal towers, each of which may be considered by itself.

Cables.—The use of the eye bar chains is older than the use of wire in suspension bridges. It is proposed to make these eye bars of special steel, having an elastic limit of 50,000 pounds per square inch, and to subject them to unit stresses about one-half those put on the wire cables of the Williamsburg Bridge. As the cables must carry their own weight, as well as that of other parts of the bridge and the moving load, their section must be somewhat more than double the section of wire cables. The quality of this steel is the only novel feature about these cables, and while the indications are that a steel will be obtained which will fully meet the requirements of the case, we ask to defer any final opinion on this subject for the present. If it should be found impracticable to get this high grade of steel, similar chains can be made of steel which is in daily use, in-

volving an increase in size of chains, but not modifying the general features of the design. The chains have decided advantages in the accessibility of all parts for inspection and protection, as well as in economy and rapidity of erection; they are to be preferred to wire cables whenever the cost of the chains is not materially greater. The cost of eye bar chains and wire cables in this bridge would be about the same.

Stiffening Truss.—Each chain is stiffened by three trusses, one for each span, the upper members being the curved chains, the lower members being in line with the floor for about half the length of each span and inclined upward, from such horizontal lines, to the top of each tower.

Towers.—The tower adopted is, perhaps, the most novel feature in the design, but the novelty consists in its application to a structure of this magnitude. Each tower is really a bent and consists of four vertical posts, which are built steel members, each supported on a pin at the bottom, the chains being rigidly fastened to the top with pins. The four posts are connected by cross struts and bracing into a rigid frame more than 300 feet high and 96 feet wide between centers, which is held vertically by the chains, but is free to rock on the pin bearings below to accommodate such changes in length as may take place in these chains under strains and temperature. The design is correct in principle and secures more uniform pressures and results more closely coinciding with the calculations than may be obtained from any form of rigid tower. Wherever metal towers are used we consider that the best practice is to fasten the cables rigidly to the top of the towers, providing for changes of position by the spring of the tower rather than by movable saddles, the increased strain in the metal caused by such deflections of the towers being easily kept within safe limits. The device of a frame supported on pin bearings below eliminates even these strains.

Shenango Valley Railroad Developments.

The Baltimore & Ohio Railroad Company are preparing to expend an immense amount of money in the improvement of their Pittsburgh and Western division between Allegheny and New Castle, Pa. The road for a distance of 40 miles between Ellwood City and Pine Creek, near Allegheny, is to be practically rebuilt, at an estimated cost of \$1,250,000. The line is now double-track all the way from Allegheny to Youngstown.

The Buffalo, Rochester & Pittsburgh Railroad and the Bessemer line of the United States Steel Corporation are reported to have arrived at an agreement by which the Bessemer road will use the new track now being constructed from Butler to New Castle by the former company. The entrance of the Wabash, Buffalo, Rochester & Pittsburgh and Bessemer lines into New Castle appears to make the city much more secure as one of the centers of the iron and steel business. The Wabash has at last gained an entrance which will give it a depot site near the business center and connections with most of the mills and furnaces.

It is reported, and very generally believed, that the Pennsylvania Railroad Company are having plans prepared for a new depot and divisional terminal to be erected at New Castle, to cost \$500,000. The Pittsburgh & Lake Erie Railroad Company are preparing for the erection of a fine passenger depot, an improvement very badly needed. The Erie system cannot much longer delay very extensive improvements on track and general facilities. The same activity is seen at Sharon, where the Pennsylvania Company are preparing to spend a great deal of money on their tracks.

It seems almost certain that extensions will soon be made by the different lines to coal and limestone fields in Lawrence and Butler counties, Pennsylvania. Leasing is going on steadily in the Eastern portion of Lawrence County by well informed parties.

France proposes to coin 16,000,000 25-centime nickel coins, which will call for 112 metric tons of nickel.

The Iron Age

New York, Thursday, March 12, 1903.

DAVID WILLIAMS COMPANY,	PUBLISHERS.
CHARLES KIRCHHOFF,	EDITOR.
GEO. W. COPE,	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	HARDWARE EDITOR.
JOHN S. KING,	BUSINESS MANAGER.

The Steel Corporation's Proposed Improvements.

The official announcement made last week of the improvements authorized by the Board of Directors of the United States Steel Corporation was studied with great interest in the iron trade, although many of the additions to plant had been foreshadowed by semiofficial reports previously printed.

One statement very widely published, possibly without direct official sanction, should, however, be corrected, because it is likely to give rise to very exaggerated ideas as to the additions to capacity contemplated. This statement is to the effect that "when the improvements shall have been completed there will be added to the subsidiary companies a total capacity of 2,700,000 tons of all products." This has been widely interpreted as meaning that the marketable production will be increased by that huge quantity. That is not the case.

On carefully going over the details of the improvements it appears that in this tonnage are included pig iron, steel billets and various rolled products, such as plates, skelp, sheets, &c. This means a duplication of tonnage if the measure of the capacity of the properties of the corporation is taken according to the output of finished products. The products are largely marketed in finished forms, only a comparatively small part of the output being sold to outside interests in raw or partly manufactured form. As nearly as the figures for additional capacity of finished products can be arrived at from the facts stated, it would appear that the capacity will be increased at least 1,000,000 tons. This covers an increase of 400,000 tons in merchant pipe, about 360,000 tons in plates, 126,000 tons in rails, 44,000 tons in sheets and the remainder in such forms as wire and tin plate. The production of steel billets will also be increased about 1,000,000 tons. The capacity for the production of pig iron will be increased about 775,000 tons. It might be assumed from these figures that the increase in capacity in these various forms does not balance itself, but the explanation of this apparent discrepancy lies in the fact that a great increase in furnace capacity is already in progress, which is evidently not included in these figures, as they only apply to recently authorized betterments. Thus in the Pittsburgh district there have been recently completed two new furnaces at the Edgar Thomson Works and one at Carrie, and work is progressing at a fourth furnace at the Ohio Steel plant. Then there has been completed for some time past the new furnace at the Riverside Works, Wheeling, which it has been impossible to blow in for lack of coke.

It will be observed also that there is nothing included in the list for the American Bridge Company, whose great modern bridge plant in the Pittsburgh district is now approaching completion.

Nor is, of course, any reference made to the recent acquisition of the Sharon and Donora plants, with practically completed finishing departments, but with their adequate blast furnace equipment still under construction, and in the case of the Donora Works with a large open hearth plant being erected. When these improvements are completed these controlled enterprises will be practically self contained. Nor is there counted the Troy

establishment, with its three furnaces and a Bessemer plant, which needs some remodeling.

These changes in ownership have not, of course, really added to the capacity of the country, but they have emphasized the preponderance of the corporation.

It will be observed upon carefully scrutinizing the list of proposed improvements that not so much attention has been given to some branches of production as might have been expected as a consequence of the extraordinary demand in these lines, which has gone considerably beyond the capacity of existing works. For instance, it was to be expected that important additions would be made to the capacity for producing structural shapes. The only new construction in this line appears to be a structural plant at South Chicago. This is an important step, and one which is fully warranted by the heavy consumption of structural material in the Northwest, which has hitherto been supplied from Pittsburgh or other Eastern points. A structural plant has long been projected at Chicago, and plans for it were prepared before the consolidation of the Illinois Steel Company with the other properties in the forming of the corporation. It is a question, however, whether the construction of this plant will fully meet the necessities of the corporation in handling their trade in structural material in that territory.

The improvements to be made in the plant of the corporation now producing merchant pipe are very formidable, and point to a determination to more thoroughly dominate this branch of the trade. The location of a completely new plant of the most improved character at Lorain is an admirable step. It would appear that, notwithstanding the general belief that the capacity for the production of sheets is much above the present requirements of the country, the managers of the corporation have no fears for the future, as they propose to add considerably to their productive capacity in this line. A most interesting announcement in connection with the tin plate industry is the proposed installation in various mills of recently developed methods of manufacture which it may be presumed will considerably diminish the cost of production.

The most significant feature of the new plans, however, is the lowering in costs which the managers expect to realize. Semiofficially, it is stated that these are figured at \$5,000,000 per annum. It is well known in the trade that the close comparison of the results obtained in operation and management at the different plants has effected important direct economies, and that it has pointed out the means by which a further lowering in cost may be effected. It is fair to presume that the elaborate scheme now worked out is to a large extent the fruit of the labors which have been vigorously pushed since the organization of the corporation. To the friends of the United States Steel Corporation and to those who hope to see our country's iron industry forge ahead this phase is the most encouraging. It is in line with the true mission of the modern industrial consolidation, whose greatness and success are not necessarily measured by the completeness of its control of mineral property and manufacturing equipment.

The Wabash Strike Injunction.

The injunction granted at St. Louis by Judge Adams of the United States Court for the Eastern district of Missouri, restraining the Railway Trainmen and Brotherhood of Locomotive Firemen from ordering a strike on the Wabash Railroad, is one of the most important steps yet taken in any controversy between employees and employers, or rather between labor unions and the

management of corporations. The entire business world is interested both directly and indirectly in the principles involved, and which will probably be definitely settled by an appeal to the Supreme Court of the United States before the end of the present difficulty comes. The press has been teeming with comments, and, generally speaking, the attitude assumed has been fair and the points at issue have been correctly understood. This is not true, however, with some of the Western journalists, who seem to think that the United States judge has violated the constitutional right of the individual American citizen in ordering the officials of the labor organizations named "to desist and refrain from in any way or manner ordering, coercing, persuading, inducing, or otherwise causing directly or indirectly" the employees of the Wabash Railroad to leave its service.

It should be kept in mind that this is not an injunction against the employees of the railroad. In the exercise of his individual right every employee is at liberty to leave the service of the company as he may determine, and the right to cease work is not denied or interfered with by the injunction issued by Judge Adams. It is important to note that a railroad is a common carrier, acting under a corporate franchise as a quasi-public service, and therefore not only the corporation and their employees, but the public have rights to be safeguarded. In view of their obligations the courts will not allow the railroad corporation, for any purpose of their own, to suspend operations. Is it right, then, for them to allow an organization, comprising only a part of the railroad employees, by its acts to suspend the operation of a railroad, which would follow from the throwing of their employees out of work, which would prevent the performance of their obligations to shippers of merchandise and the public in general, as well as throwing out of gear the business over a large area of country tributary to it? The court cannot and does not seek to prevent individuals from leaving the employment of the railroad, but it does restrain the officers of an organized body from coercing its members into interfering with the operations of the common carrier.

In view of the many violations of injunctions by labor unions, it is commendable that the labor officials involved in the present controversy recognize the legal authority and respect the law. The injunction is to be contested in the proper place—that is, the courts—and not to be fought out in railroad yards and on trains. In the present congested condition of the railroads, a strike would be productive of unusual hardship to innocent parties.

The Membership of Labor Unions.

Organized labor invariably assumes to speak for the entire body of wage earners, and treats nonunion labor as a trifling minority which has no right to imperil what the great body of their fellow workers regard as for their good. The truth is that organized labor is a small part of the working forces in what are called organizable industries, and these constitute but a part of the whole working population, the whole number of persons engaged in working for their livings.

Nearly 20 years ago the late Col. Richard J. Hinton, who was a warm friend of organized labor, published in the *North American Review* the results of his efforts to ascertain how many workers were organized. He admitted that many unions refused to give information, which they would have been glad enough to make public had their numbers been imposing, and most of the union officials who gave him information stated their numbers

in round thousands, indicating guess work or exaggeration. After revising the estimates as well as he could and allowing for duplications, he reached the conclusion that a little more than 600,000 persons were in labor unions. This was a little more than one-fifth of the persons employed in the last preceding census year in mechanical and manufacturing establishments, including women and boys, and in mines, petroleum wells and refineries, railroads and navigation. As the number of persons so employed had undoubtedly increased in five years the number of organized laborers in 1885 was well under 20 per cent. of the persons employed in organizable industries.

But the 20 per cent. may safely be reduced to 14 per cent. by a conservative revision of Colonel Hinton's details, and the classes of workers in his computation comprise about one-fourth of all persons in gainful occupations, making organized labor not more than 3.5 per cent. of all persons in gainful occupations. The estimate of 14 per cent. in organizable industries was supported by a report of the Maine Bureau of Labor several years later, which showed that of 556 workmen from whom information was obtained 14 per cent. belonged to unions. A labor bureau report from Montana gave the number of organized laborers in enumerated industries at 19 per cent. of the total, and mining is a leading industry in Montana and an industry peculiarly susceptible to organization. Omitting mining and smelting, only 11.5 per cent. of the men in the enumerated industries were organized. In the State of New York in 1900 there were not much less than 3,000,000 persons—perhaps a little more—in gainful occupations, and about a quarter of these were in organizable industries. Last year, two years later than the census, and after a period of general employment and high wages had greatly increased the membership of the unions, their officers reported to the Labor Bureau of the State of New York a membership of about 280,000. This is 38.5 per cent. of the persons in organizable industries two years earlier, and a good deal less than 10 per cent. of all the persons then engaged in gainful occupations. In March, 1897, the membership of labor unions in the State of New York was only 142,570, including women.

In Massachusetts the percentage of population which was engaged in gainful occupations in 1890 was 44, and it was certainly not less in 1900. The fact that the proportion in gainful occupations was unusually large in this manufacturing State indicates that a larger proportion of persons working for their livings would be in organizable industries. Forty-four per cent. of the population of Massachusetts in 1900 is 1,233,890. If 40 per cent. of these were in organizable industries the number so engaged would be 493,556. The business agent of the Brewery Workers' Union testified in court in Boston last summer that "he had looked up the strength of organized labor, as counsel for complainants requested him to do, and had found that there were about 140,000 union members in Massachusetts." This is 11.3 per cent. of all engaged in gainful occupations and under 30 per cent. of those in organizable industries, as above estimated. Reports of State labor bureaus in the census year give the membership of labor organizations in Indiana as 24,424 in a population of 2,516,562; in California, 17,163 in a population of 1,485,053, and in Colorado, 24,968, over a third of whom were employed in and about mines, in a population of 539,700. During the steel strike of 1901 there was published a confidential report of the Amalgamated Association giving its membership in every year from 1877 to 1901; the membership in the strike year was only 13,893, instead of the 40,000

claimed, and the largest membership there had ever been was 24,068, ten years earlier, the year before the Homestead strike.

Mining is an occupation peculiarly susceptible to organization. A labor census of Montana about six years ago showed that 37 per cent. of persons employed in mining were organized. At the recent convention in Indianapolis of the United Mine Workers of America "a resolution presented by District 19, covering parts of Kentucky and Tennessee, called attention to the fact that of the 20,000 miners in that district only about one-fourth were organized, and asking that great effort be put forth in that district during the coming year." In an article contributed to a volume entitled "Labor and Capital," published by Putnam's Sons last year, John Mitchell says of the strike in the anthracite mines in 1900: "At the time the strike was inaugurated less than 8000 of the 142,500 persons employed were members of our organization. Notwithstanding the fact that we represented so small a percentage of the total number of employees, we went to the employers," &c.

In 1890 the percentage of population in the United States which was in gainful occupations was 36.31. It was probably more than 38 in 1900, but at that ratio the working population would be close to 29,000,000 in 1900. If one-fourth of all were in organizable industries these would include 7,250,000. If one-fifth, a very liberal estimate, are in unions, their membership would be less than 1,500,000. By adding the estimated membership of the leading organizations Commissioner Carroll D. Wright estimated in the *Contemporary Review* last year that there were about 1,500,000 members of labor unions in the United States. The total membership in British labor unions in 1896 was a little under 1,500,000, and the labor movement is stronger there than here. The membership of labor unions in the United Kingdom was about 28 per cent. of the organizable population, and well under 10 per cent. of all the persons working for a living.

It is quite clear, therefore, that numerically the labor unions are far from being as formidable as they pretend to be.

The Chicago Pneumatic Tool Company.

At the annual meeting of the stockholders of the Chicago Pneumatic Tool Company, recently held at Jersey City, N. J., the election of directors resulted in the choice of the following: Three year term, Joseph Boyer, John C. Talte, W. O. Duntley, C. H. Wacker, W. J. Chalmers; two years yet to serve, John B. Milliken, C. M. Schwab, J. W. Duntley, Max Pam, W. B. Dixson, C. H. Matthlessen; one year yet to serve, J. R. McGinley, Charles Miller, J. A. Lynch and A. W. Maconochie. The reorganization gives a sufficient number of resident directors at Chicago that directors' meetings may be held in the Western city. Heretofore the business of the company has suffered somewhat from the inability to secure a quorum at Chicago.

The Board of Directors organized by the election of the following officers: President, J. W. Duntley; vice-president, W. O. Duntley; secretary and treasurer, J. B. Milliken; assistant secretary, L. Beardsley. Executive Committee: J. W. Duntley, W. J. Chalmers, C. H. Wacker, J. A. Lynch, Joseph Boxer.

It was decided to build the proposed plant on the Clyde, Scotland, at a cost of \$400,000. The company have given formal notice of the consolidation of the Little Giant plant, at Aurora, Ill., with the factory at Cleveland, and hereafter all work will be executed at Cleveland. Customers are notified that those wishing repairs or returning drills for other purposes should consign direct to the Cleveland factory and advise the Chicago office when the shipment is made.

CORRESPONDENCE.

Corrugated Furnace Tests.

To the Editor: In reply to the Continental Iron Works' letter of the 20th ult., signed by Mr. Rowland, their president, appearing in your recent issue, it is to be regretted that Mr. Rowland should allow himself to be carried away by the heat of argument so far as to forget being courteous to a competitor who has no desire to quarrel with him, but simply to meet him on a fair business basis. Mr. Rowland's chief grievance seems to be that the Board of Supervising Inspectors should think it necessary to test furnaces to destruction by hydrostatic pressure so as to ascertain their true value against collapsing pressure, and further that the unfortunate term "old style" should be used to describe any form of corrugated furnace, although in this latter respect the fact that the patentee of the Suspension Furnace, which Mr. Rowland now manufactures, has lately taken out a United States patent for what he considers an improved furnace, may properly entitle the former furnace to be spoken of as the "old style." As to what effect corrugating the furnaces after welding has on the physical qualities of the steel is a question which is hardly within the scope of this letter, but as to the mechanical results Mr. Rowland does not deny that a thinning of the metal takes place on the tops of the corrugations during the operation, or else why is it deemed necessary, before sending out furnaces, to bore small holes at the tops of the corrugations to ascertain whether any undue thinning has taken place? In regard to Mr. Rowland's remarks about our last furnace tested before the board, we do not think that even he considers that he has drawn a fair inference when he tries to prove that the thickest portion of the furnace is the weakest, and he altogether forgets to state that, due to a plug blowing out when the pressure reached 1200 pounds, the stress was suddenly released, long after the elastic limit of the material had been reached. The effect of an incident of this kind upon steel is apparent to any one familiar with it and its qualities.

Before closing this letter we would like to say that the greatest interest was shown, not only by the large and representative number of our guests who were present, but by engineers, boiler makers and shipbuilders at large, who were solicitous in their inquiry for copies of these tests, as well as copies of tests upon which the constants for the different furnaces in this country have been obtained. We have met this demand as far as we are concerned by publishing in the fullest possible manner all the information in our possession so far as the Brown Improved furnace is concerned, and we feel sure that Mr. Rowland will be only too pleased to add to our efforts in this direction by publishing in your most valuable paper particulars of the tests made, by which the Board of Supervising Inspectors granted the constant of 15,000 for the Morrison type, as none of the tests made by the Leeds forge (who are the English makers of the Morrison Furnace) so far as we are aware when the furnaces were made of such material, having the approved tensile strength, as is required for plates subjected to the action of flame, were sufficient to warrant the granting of such a high constant, based on the factor of safety of six to one, as required by the Board of Supervising Inspectors in this country.

All interested engineers, boiler makers and shipbuilders will await with interest this information.

Yours truly,

WORTH, BAILY & CO.

PHILADELPHIA, March 7.

Iron Ore Found on Alaskan Islands.—A press dispatch from Tacoma, Wash., dated March 8, states that Alfred G. Brooks of the Geological Survey has discovered on Prince of Wales and adjacent islands of southeastern Alaska large deposits of iron ore. A mining expert, who has been investigating the deposits, says they comprise magnetic iron ore equal to that found in Sweden. Two companies, who have arranged to import ores from British Columbia, for smelting in blast furnaces on Puget Sound, may now save the duty.

Our Production of Bessemer Steel Ingots and Steel Rails.

The American Iron and Steel Association have just published the following report on the production of Bessemer steel and of steel rails in the United States in 1902:

Neither the production of Bessemer ingots nor the production of Bessemer rails kept pace in 1902 with the marvelous growth in that year of our iron and steel industries taken as a whole, which was owing entirely to the fact that the Lackawanna Iron and Steel Company dismantled their Bessemer plants and their rail mills, as well as their remaining blast furnace, at Scranton, early in the year, preparatory to the erection at Buffalo by the Lackawanna Steel Company of new and more extensive works, which are not yet entirely completed. The North Works of the company at Scranton made their last rails on January 16, 1902, and the South Works made their last rails on February 26.

Bessemer Steel Ingots and Castings.

The total production of Bessemer steel ingots and castings in 1902 was 9,306,471 gross tons, against 8,713,302 tons in 1901, an increase of 593,169 tons, or 6.8 per cent. The increase in 1901 over 1900 amounted to 2,028,532 tons, or over 30 per cent. The production of 1902 was the largest in our history. The following table gives the production of Bessemer steel ingots and castings in the last six years. Of the production last year 10,466 tons were steel castings, against a production of 6764 tons in 1901:

	Bessemer ingots.		Bessemer ingots.
Years.	Gross tons.	Years.	Gross tons.
1897.....	5,475,315	1900.....	6,684,770
1898.....	6,609,017	1901.....	8,713,302
1899.....	7,586,354	1902.....	9,306,471

Below we give by States the production of Bessemer ingots and castings in the last four years:

	1899.	1900.	1901.	1902.
States.—Ingots.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pennsylvania	3,968,779	3,488,731	4,293,439	4,379,516
Ohio	1,679,237	1,388,124	2,154,846	2,528,802
Illinois	1,211,246	1,115,571	1,324,217	1,443,614
Other States.....	727,092	692,344	940,800	954,539
Totals.....	7,586,354	6,684,770	8,713,302	9,306,471

There was no Clapp-Griffiths works in operation in 1902, and only two Robert-Bessemer plants were active. Five Tropenas plants were at work, as compared with seven in 1901. In addition one Bookwalter converter was running. All these works that were active were engaged in the production of steel castings only.

Steel Rails.

The production of all kinds of Bessemer steel rails by the producers of Bessemer steel ingots in 1902 was 2,876,293 gross tons, against a similar production in 1901 of 2,836,273 tons, in 1900 of 2,361,921 tons, and in 1899 of 2,240,767 tons. The maximum production of Bessemer steel rails by the producers of Bessemer steel ingots was reached in 1902, but the increase in that year over 1901 amounted to only 40,020 tons, or 1.4 per cent. As compared with 1887, 15 years ago, the increase in 1902 in the production of Bessemer rails amounted to only 831,474 tons, or 40 per cent., while during the same period the increase in the production of Bessemer ingots amounted to 6,370,438 tons, or almost 217 per cent. The following table shows the production by States of Bessemer steel rails by the producers of Bessemer steel ingots in the last four years. The figures do not include a small quantity of rails made each year from purchased blooms or from rerolled steel rails, statistics for both of which products for 1902 are not yet available.

	1899.	1900.	1901.	1902.
States.—Rails.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pennsylvania	1,224,807	1,195,255	1,406,008	1,148,425
Other States.....	1,015,960	1,166,666	1,430,265	1,727,868

Totals..... 2,240,767 2,361,921 2,836,273 2,876,293

At the request of the manufacturers we separated for 1897, for the first time, the production of rails weighing 45 pounds and less than 85 pounds to the yard from those weighing less than 45 pounds and over 85 pounds to the yard. This separation we continue for 1902, as

follows. Bessemer rails made from purchased ingots or from rerolled rails are not included:

	45 pounds			
	Under 45 pounds.	and less than 85.	85 pounds and over.	Total.
States.—Rails.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pennsylvania	53,964	786,567	327,894	1,148,425
Other States.....	173,104	1,237,496	317,268	1,727,868
Totals for 1902.....	227,068	2,004,063	645,162	2,876,293
Totals for 1901.....	140,214	2,202,237	493,822	2,836,273
Totals for 1900.....	154,796	1,605,067	602,058	2,361,921

It will be noticed that there was a considerable decline in 1901 in the production of Bessemer steel rails weighing 85 pounds and over as compared with 1900, but that in 1902 there was an increase over 1900 and a very large increase over 1901. The production of rails weighing between 45 and 85 pounds shows a slight decrease in 1902 as compared with 1901.

The total production of rails in 1902 will include rails made from open hearth steel, rails rolled from purchased Bessemer blooms, rerolled rails, and iron rails. The total from all these sources in 1901 amounted to 38,366 tons.

With the exception of the Lackawanna plant at Scranton all our Bessemer rail mills were operated nearly to their full capacity in 1902, the demand for steel rails being greater than the supply all through the year. In addition to our large production of rails we imported last year 63,522 tons of iron and steel rails, but to balance this importation we exported 67,666 tons of iron and steel rails. In 1901 we exported 318,956 tons of rails and imported only 1905 tons. Virtually all our imports and exports of rails are steel rails.

February Fluctuations in Iron Stocks.

The following table shows the extent of transactions and the fluctuations in quotations of the stocks of iron and steel companies in the month of February, with the dates on which the highest and lowest prices on each stock were realized:

	Low-Date.High-Date.			
	Sales.	est.	Feb.	est.
\$17,701,500 Am. Bicycle Co., com.	1,600	%	28	%
9,294,900 Am. Bicycle Co., pref.	4,100	%	3	%
9,500,000 Am. Bicycle Co., bonds	7,000
41,233,300 Am. Can., com.....	5,225	9%	7	10
41,233,300 Am. Can., pref.....	4,660	44%	27	48½
29,000,000 Am. Car & F'dry, com.	31,300	39%	28	41%
29,000,000 Am. Car & F'dry, pref.	4,800	91	28	92%
24,100,000 Am. Locomotive, com.	77,500	28%	3	31%
25,000,000 Am. Locomotive, pref.	7,900	93½	2	95%
45,000,000 Cambria Steel.....	8,350	24%	27	25½
7,000,000 Central Foundry, com.	1,000	3%	27	3%
7,090,000 Central Foundry, pref.	1,100	16	25	17½
17,000,000 Colorado Fuel & Iron.	11,600	73	27	78½
25,000,000 Crucible Steel, com...	5,500	20	28	22
25,000,000 Crucible Steel, pref...	5,850	84%	2	86%
1,975,000 Diamond State Steel.	1,200	%	26	%
2,368,100 Empire I. & S., com..	2,750	13%	6	17½
2,281,400 Empire I. & S., pref..	600	45	27	47
15,000,000 Inter. Pump, com....	1,000	43½	6	45
8,850,000 Inter. Pump, pref....	2,000	82½	7	84
8,396,000 Nat. Enam., com....	2,500	34%	2	37%
15,441,800 Nat. Enam., pref....	1,050	88	9	95
4,449,500 Otis Elevator, com...	3,650	42	10	47½
6,350,000 Otis Elevator, pref...	500	97	24	98½
10,750,000 Pa., new, com., Phila.	200	50	18	51
16,500,000 Pa., new, pref., Phila.	600	90%	7	92%
12,500,000 Pressed Steel, com...	11,700	62%	28	64
12,500,000 Pressed Steel, pref...	8,500	92½	5	95
10,000,000 Railway Spr., com...	13,000	32%	2	37
10,000,000 Railway Spr., pref...	3,400	87	6	90
27,191,000 Rep. I. & S., com....	57,200	21	2	22%
20,306,900 Rep. I. & S., pref...	11,900	78%	2	80%
7,500,000 Sloss-Shef. S. & I., com.	11,100	66%	3	72
6,700,000 Sloss-Shef. S. & I., pref.	500	93%	2	97½
20,000,000 Tenn. Coal & Iron....	134,000	63	2	67%
1,500,000 Tidewater Steel.....	550	4%	27	4%
12,106,000 U. S. C. Pipe, com....	4,300	13%	19	15
12,106,000 U. S. C. Pipe, pref...	3,000	53	19	54%
510,361,300 U. S. Steel Co., com...	555,000	37%	2	39%
508,511,200 U. S. Steel Co., pref...	225,000	87	2	89%
1,500,000 Warwick I. & S.....	3,300	5	10	5½
Allis-Chalmers, com...	5,250	18	11	23
Allis-Chalmers, pref...	1,100	86	7	87½
Am. Steel F'dries, com...	19,000	17%	19	18½
Am. Steel F'dries, pref...	14,400	65	2	69½

The American Steel & Wire Company exported in February about 6000 tons of wire and wire nails. Of this 1442 tons went to South America and 1189 tons to Australia.

British and German Marine Notes.

LONDON, February 28, 1903.—Two or three interesting facts have come to light this week respecting ships built for the mercantile marine or for the navy. The first is that the British Admiralty proposes to adopt the new American models of metal cabin furniture for British war ships. I am not surprised to hear this. Only recently a prominent American manufacturer in this particular line called at this office and confidentially informed me that his models and samples were being considered by the naval experts, and he was most hopeful of a favorable result.

As the outcome of the "Cobra" court martial, when a good deal of evidence was given on the effect of hogging and sagging stresses in a heavy sea, the "Wolf," torpedo boat destroyer, was, about six months ago, set aside for a series of experiments at Portsmouth. The first of the series has been concluded, and the vessel has been undocked to be prepared for a continuation of the trials at sea. The dry dock experiments were of a somewhat unusual character. The vessel was so shored up, or fortified, to use the technical word, inside that there was no possibility of her sustaining any damage. In this condition she was held up on cradles, and as the center or end supports were weakened or removed the hogging or sagging stresses were calculated by scientific instruments. As the "Wolf" was originally one of the stiffest of all the destroyers, and as, owing to her "fortifications," she could sustain no damage, she is to have her internal supports removed while the hypothetical stresses are being mathematically worked out. As soon as she is ready for sea she is to be sent to the Solent, where, under the vibration of the engines, the accuracy of the testing instruments will be tried. The final phase of the trial will consist of sending her into the Channel in her normal seagoing condition, to pick up bad weather and cross seas, and then, by means of the same instruments, measuring the force of the stresses.

Designs for the new Cunard ships are nearly complete and model experiments have reached finality, but the vessels are so much beyond precedent in size and contemplated speed that an element of uncertainty causes anxious consideration. They will be approximately 760 feet on the water line, with 80 feet beam. As about 18,000 horse-power is the most that has been put hitherto onto any one shaft, it has been thought wiser, instead of two, to put three propeller shafts into the vessels, although that system has hitherto been accompanied with certain drawbacks, and the experiences of foreign war ships have not commended the system to our Admiralty. The engines of the new vessels are designed for over 60,000 horse-power, and are expected to drive the vessels at a sea speed of some 25 knots on a coal consumption of 46 tons per hour.

Particulars are now to hand of the output of German shipbuilding last year. The German shipbuilding yards turned out altogether 227 steamers, with a gross registered tonnage of 212,233, and 280 sailing vessels, of 58,715 tons. The steamers show a falling off as compared with 1901 of three ships and 49,000 tons. To reach accurately the actual increase of tonnage in the mercantile marine of Germany it is necessary to bear in mind, first, the deduction of the 11 war ships which were completed last year, and, second, there must be deducted river craft, sailing vessels under 100 tons, tug boats, lighters, ice breakers, dredges, &c. The turn out of larger vessels, since and including 1900, is seen in the following table:

	Steamers.	Tonnage.	Sailing ships.	Tonnage.
1900.....	63	213,894	24	11,258
1901.....	63	210,218	15	5,813
1902.....	55	161,833	11	11,525

Of this total production there were built for foreign shipowners eight large steamers, of 20,811 tons, in 1902. The steamers built abroad to the order of German ship owners were as follows:

	Steamers.	Tonnage.
1900.....	25	99,888
1901.....	26	105,122
1902.....	16	37,374

Two steamers, of a total tonnage of 3000 tons, are now being built abroad for German owners. The decrease

in the activity in German shipbuilding during 1902 was due to the fact that, owing to the general depression in trade throughout Germany, the steamship owners were compelled to reduce their orders for new vessels.

S. G. H.

MANUFACTURING.

Iron and Steel.

Several New York capitalists have become interested in the Hyle Bros. Steel Company of Syracuse, N. Y., and the Hyle Steel Tool Company have been incorporated with a capital stock of \$1,000,000 to take over the business of the former company. They will move into a new plant about the middle of April and will manufacture high grade tool steel and tools.

The Bethlehem Steel Company, South Bethlehem, Pa., made the largest shipments of side armor of the year this week to Seattle, Wash.; Philadelphia, and Newport News. In the consignment were 160 tons for the battle ship "Nebraska," now in the course of construction at Seattle; 400 tons for the battle ships "Pennsylvania" and "Colorado" being built at Cramp's, and nearly 100 tons of barbettes for the cruisers "Maryland" and "West Virginia," nearing completion at Newport News.

The stockholders of the Inland Steel Company, Chicago, have decided to increase the capital stock of the company from \$2,000,000 to \$2,500,000, it having been found necessary to provide a more ample amount of working capital. The plant of the company at Indiana Harbor, Ind., is now running smoothly and the capacity of the works has been sold for many months to come, the product thus sold comprising sheets, bars and billets.

The strike order issued by the National Association of Iron Workers against the American Bridge Company will affect 500 structural iron workers at Buffalo and will seriously delay work at present being done on several large buildings, including a portion of the new plant of the Lackawanna Steel Company.

The Lookout Mountain Iron Company, Birmingham, Ala., have closed a contract for a Rand Drill Company duplex air compressor of 2300 cubic inches air per minute. The sale was made through Shook & Fletcher, manufacturers' agents, Birmingham, Ala.

Fires were lighted at the new plant of the Clearfield Iron & Steel Company, Clearfield, Pa., March 4.

The 20 hot mills at the Sharon Works of the American Tin Plate Company, at Sharon, Pa., are again in full operation. It is the intention to use Bessemer bars at this plant in the future.

The rod and wire mills of the American Steel & Wire Company at Beaver Falls, Pa., are being dismantled and most of the equipment is being shipped to second-hand machinery dealers in Pittsburgh. A part of the machinery will be used in other plants of the American Steel & Wire Company.

General Machinery.

Asa A. Weimer and Edgar A. Weimer, who own a half interest in the Weimer Machine Works Company, Lebanon, Pa., have purchased an 18-acre tract of land at Hebron, east of Lebanon, upon which they intend to erect a large iron works, plans for which are now under way. The site cost about \$18,000, and the plant will be entirely independent of their present works.

Work will be commenced next week on the new machine shops of the Landis Tool Company, at Waynesboro, Pa., and it is expected that they will be ready for operation by July 1. The Landis Company have received an order for two large universal grinders for the Frankfort Arsenal at Philadelphia. The company never had so many orders booked this early in the year as at present, and stand badly in need of their new shops.

The Locke Steel Belt Company, Bridgeport, Conn., manufacturers of tempered steel, detachable sprocket chain and attachments, have secured a very desirable plant at Water street and South avenue, the main building of which is 60 x 200 feet. For some months new machinery for this plant has been under construction at the shops of Villard & Osswald, Brooklyn, N. Y., and a number of shipments to Bridgeport have already been made. When the entire plant is installed the Locke Company will have several times their present capacity.

The Hardie-Tynes Foundry & Machine Company, Birmingham, Ala., are extending their machine shop 150 feet and will install a considerable amount of new machinery. Business is so active that their increased equipment will be fully employed.

The Machinists' Supply Company of Chicago have established a branch house at 200 Water street, Pittsburgh, in charge of James C. Simms, Jr.

The Hendey Machine Tool Company, Torrington, Conn., have increased their capital stock from \$120,000 to \$300,000 for the expansion of the plant and business.

The East Iron & Machine Company of Lima, Ohio, recently incorporated with \$200,000 capital stock, have acquired the old plant of the Lima Locomotive & Machine Company and will manufacture machinery.

The United Supply Company of Toledo have been incorporated under the laws of Michigan with \$150,000 capital stock.

They have absorbed the plants and business of the National Mfg. & Supply Company of Saginaw, Mich., the Pittsburgh Steel Shafting Company of Toledo and the Elmer E. Dale Supply Company of Toledo. They will engage in the manufacture and sale of supplies for railways, mines, mills, marine interests, lumbermen, steam fitters, engineers and contractors, handling such goods as pulleys, shafting, leather belting, wire rope, boilers, engines, &c. W. T. Wickes of Saginaw, Mich., will be president, Elmer E. Dale vice-president and manager, and J. D. Swartwout, Toledo, secretary-treasurer. The company have leased the two Quale warehouses at the foot of Madison street, comprising 47,000 square feet of floor space. The Pittsburgh Company at present occupy one floor of one of these buildings, and the business of the Dale Company will be removed to the new site at once. The warehouses at Saginaw will be retained.

The American Seeding Machine Company were incorporated at Trenton, N. J., March 9, with a capital stock of \$15,000,000, half of which is 7 per cent. cumulative preferred stock and half common. As stated in these columns February 12, the companies included in the consolidation are chiefly builders of seed drills and seeders, as follows: Superior Drill Company, Springfield, Ohio; Hoosier Drill Company, Richmond, Ind.; Empire Drill Company, Shortsville, N. Y.; Brennan & Co. (Southwestern Agricultural Works), Louisville, Ky.; Dowagiac Mfg. Company, Dowagiac, Mich.; P. P. Mast & Co., Springfield, Ohio, and Bickford & Huffman Company, Macedon, N. Y. President Bookwalter of the Superior Drill Company of Springfield, Ohio, will probably be president of the new company.

The Interborough Rapid Transit Company, New York, have awarded the contract for the electrical equipment of the trains of the subway. The General Electric Company received the orders for all of the train controls, which will be substantially the same as those used on the Manhattan Elevated Railroad. The contract for the motors on the cars was divided equally between the General Electric Company and the Westinghouse Electric & Mfg. Company. The total amount involved is about \$2,000,000.

Interests identical with the Hobbs Mfg. Company of Worcester, Mass., have acquired control of the Witherby, Rugg & Richardson Company, manufacturers of wood working machinery. The large shop of the Witherby, Rugg & Richardson Company will be doubled in size by the addition of a four-story brick building, 120 feet long, varying in width from 50 to 70 feet. Together the buildings will give 56,000 square feet of floor space available for manufacturing. The Hobbs Mfg. Company manufacture paper box machinery. The two corporations will remain intact, but the business will be run together, the nature of the products making this economical. The enlarged shop will afford space enough for the business of both corporations. The Witherby, Rugg & Richardson business was established half a century ago, and was incorporated about a year ago with a capital stock of \$60,000. The reorganization has been effected with the election of these officers: President, Gilbert J. Rugg; treasurer, George T. Witherby; directors, these gentlemen, and Clarence W. Hobbs, Harry W. Goddard, president of the Spencer Wire Company, and J. P. Bird. The last three directors constitute the Board of Directors of the Hobbs Mfg. Company. The purpose is to enlarge and improve the wood working machinery business. Both companies will be in the market for new machinery.

The York Mfg. Company, York, Pa., shipped 55 carloads of new ice machines during February.

The Dawson Machine Company, Worcester, Mass., will move into larger quarters as soon as buildings on Sargent street can be remodeled into suitable machine shop quarters. The company are at present tenants of the Hamblin & Russell Mfg. Company, manufacturers of wire specialties, who need the room occupied by the machine shops for additional manufacturing space.

Bardons & Oliver of Cleveland, manufacturers of turret lathes and other machine tools, have acquired the factory at 10 Water street, formerly occupied by Findlay Brothers. Their factory burned down some months ago, and since then they have been occupying temporary quarters in the Balkwill Building, St. Clair street. The new factory contains 40,000 square feet of floor space, including three stories and a basement. They will install considerable new machinery, which is to be electrically driven. The Cleveland Engineering Company are preparing plans for the required electrical equipment. They are preparing to move into the new quarters and expect to be settled after April 1.

The Cleveland Punch & Shear Works of Cleveland have received an order for a number of large tools from the New American Structural Steel Company of Pittsburgh, who are erecting a large plant for the production of structural work.

The Fraser Machine Works of Cleveland are remodeling and enlarging their plant to carry on a line of die work, screw machine work, experimental and model work, in addition to their regular line. N. W. Thomas has recently become manager of the company, and he is planning to expand the business in several new directions.

The Reserve Press Company of Cleveland, who were reorganized a short time ago, are becoming an important factor in the production of heavy presses and dies for sheet metal work, and they are prepared to build presses up to 40,000 pounds or larger

If desired. Among other large contracts they are building 15 dies and 11 presses for a new hinge plant at Ashtabula; nine presses for the Van Wagner Company of Cleveland, who have established a plant on Perkins place for the production of hinges; a number of electrically driven presses for a metal mail box plant; four large presses and dies for the Sun Mfg. Company, Mineral Ridge, Ohio, who will make stamped sad irons; several large presses for the Wilson & Hayes Mfg. Company, Cleveland, manufacturers of automobile fenders; a large multiple punch for the Ohio Ceramic Engineering Company, Cleveland, manufacturers of brick cars, and a large stove press for the Alright Mfg. Company, Olmstead Falls, Ohio.

The Ray Automatic Machinery Company, Cleveland, are devoting a great deal of attention to the production of sheet metal automobile parts, such as fenders, hoods, &c. This business has grown so rapidly of late that they are contemplating increasing their facilities by installing more presses.

The Toledo Foundry & Machine Company, Toledo, Ohio, are preparing to ship a large steam shovel to the Klondike, where it will be used for gold mining.

The Arctic Machine Company of Canton, Ohio, have been awarded a contract for the refrigerating machinery for the Urbana Artificial Ice & Cold Storage Company, Urbana, Ohio. The building and machinery are to be completed by June 10.

The American Window Glass Company of Pittsburgh have incorporated the American Window Glass Machine Company with a capital of \$20,000,000, to control the machines the glass company are to equip their factories with. The capital is said to be the amount they paid for the patents. The Window Glass Machine Company, incorporated with a capital of \$40,000 by the same parties, will, it is said, operate a foundry for the manufacture of the machines.

POWER PLANT EQUIPMENT.

T. C. Duncan, president and treasurer of the Union Cotton Mills, Union, S. C., and others will build a large water power plant on the Broad River at Neals Shoal, 12 miles distant, to furnish their mills and possibly surrounding towns with electricity. It is possible that a trolley line will also be constructed.

All of the boiler makers of Wilkes-Barre have demanded \$2.50 for a nine-hour day, the scale to go into effect April 1. The machinists of the same place have struck for higher wages and a nine-hour day.

The Pittsburgh Engineering Company, Lewis Block, Pittsburgh, have received a contract from the West Virginia Coal & Coke Company for 12 150 horse-power return tubular boilers. The same company will install a 14 x 15 inch Skinner engine and a 50-kw. Bullock generator and switchboard for the Cyphers Provision Company of Pittsburgh, this order being for a duplicate plant.

The council at Attica, Ohio, have authorized the sale of \$6000 worth of bonds, the proceeds to be used for the construction of a municipal electric lighting plant with which to illuminate the village and furnish light and power to citizens. Contracts for the equipment are to be placed in the near future.

The Lewis Channel Company and the Sturgeon Falls Power Company, Canada, have placed large orders with the S. Morgan Smith Company of York, Pa., manufacturers of turbine wheels.

The Vulcan Iron Works, of Wilkes-Barre, Pa., have booked a large order for small locomotives for Kerbaugh & Co., railway contractors.

The Harrisburg Foundry & Machine Works, Harrisburg, Pa., have for the past two months of this year broken all records for both new orders and production. Recent orders include a large engine for Manila, P. I., and one for Porto Rico; Austen Coke & Coal Company, Austen, W. Va., two 250 horse-power engines and two 300 horse-power engines, tandem compound, four-valve type; Knickerbocker Hotel, New York, three engines of the same type, aggregating 1000 horse-power; J. G. Brill Car Company, Philadelphia, two 300 horse-power engines; American Structural Steel Company of Pittsburgh, 150 horse-power engine; Pascagoula Street Railway Company, Scranton, Miss., two engines aggregating 500 horse-power; Northern Steamship Company of Buffalo, six engines ranging from 150 to 170 horse-power; Consolidated Gas Company of Baltimore, two 125 horse-power engines; United States Steel Corporation, six engines aggregating 1200 horse-power, and larger engines to Washington and New Orleans. The company have been approached with the proposition to enter the new Federal Power Company, now being formed in New York, but as yet have not decided to go into the combination. Negotiations are being made, however, with that end in view and the local company will go into the combine if proper inducements are offered. If this is accomplished it is probable that the Harrisburg works will be enlarged.

The Stilwell-Blerce & Smith-Valle Company of Dayton, Ohio, have lately secured a contract for a complete water works for installation in Ponce, Porto Rico. The contract, which is valued at some \$83,000, includes two compound pumping engines having a combined capacity of 5,000,000 gallons, 400 tons of cast iron water pipe, varying from 6 to 14 inches in diameter, and a 450 horse-power boiler plant.

The John F. Byers Machine Company, Ravenna, Ohio, have perfected plans and placed orders for material to rebuild their

boiler plant, which was destroyed by fire February 18. The plant will be about double the capacity of the old one.

W. D. Howe, Readsboro, Vt., is interested in a project to build a 2000 horse-power electric water power plant at Howe Pond.

The Northwestern Heat, Light & Power Company, Milwaukee, Wis., are contemplating installing an electric and gas lighting plant at West Allis. Max W. Nohl is president.

The Indianola Heating & Lighting Company of Columbus, Ohio, recently organized to furnish hot water and electric light and power throughout a large residence district in Columbus, have completed plans for their power plant to be erected on King avenue, where about 1000 horse-power of engines and generators will be installed. They are now laying mains for their heating plant. A. J. Stahl of Chicago is the designer and contractor for the plant.

Foundries.

The Hudson River Foundry Company have incorporated with a capital of \$30,000 to do a general foundry and machine shop business. The company have taken over the foundry business in Poughkeepsie, N. Y., formerly conducted by Sague & Thompson, and start off with more work on hand than the present capacity of the plant can take care of. It is their intention to enlarge the plant considerably. The officers are Isaac W. Sherrill, president; Peter H. Troy, vice-president; J. J. Thompson, secretary and treasurer; George Sague, general manager, and Peter F. Hoffman, superintendent. Sague & Thompson will continue to manufacture their own specialties.

The Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., have commenced the erection of an addition to their plant, 50 x 100 feet, which will be used for the extension of their growing trade in sheet and cast iron materials, including some new products.

The Railway Supply & Foundry Company, whose plant at Harvey, Ill., sustained damage from fire on February 22 estimated at upward of \$250,000, have awarded to G. H. Fuller a contract for the construction of a new plant at Chicago Heights. The new buildings will be located on a 5-acre tract of land recently purchased from the Chicago Heights Land Association. The foundry will be 150 x 350 feet and the machine shop 100 x 350 feet. An office building and fire proof pattern shop will also be constructed. All buildings will be of brick, stone and steel construction. The machine shop will be equipped with two 20-ton electric traveling cranes, in addition to the installation of other modern machinery. Electricity will be the motive power.

At the annual meeting of the Michigan Malleable Iron Company, Detroit, Mich., held recently, two vacancies caused by death were filled, Philip H. McMillan succeeding the late Senator McMillan as vice-president, and George M. Black succeeding James H. McMillan as secretary. W. C. McMillan was re-elected president and T. H. Simpson general manager and treasurer.

The Niell Stove Mfg. Company of Portsmouth, Ohio, are preparing to erect a large addition to their foundry. They will engage in the manufacture of steel ranges on quite an extensive scale and have turned out the first of these goods in their temporary quarters.

The Chicago Heights Foundry Company, Chicago Heights, Ill., contemplate the erection of a number of buildings at an expenditure of about \$25,000. The plant will consist of a foundry 100 x 150 feet, a machine shop 60 x 150 feet, a boiler house, pattern house and warerooms. Richard E. Schmidt, Chicago, is the architect.

The Toledo Plow Company of Toledo, Ohio, will enlarge their plant at the corner of Shore and Tudor streets, that city. A 70-foot square addition to the foundry will be erected, doubling its present capacity. Considerable new machinery will be installed.

The annual meeting of the stockholders of the Solid Steel Casting Company of Chester, Pa., was held recently. The directors elected for the ensuing year were Fred. W. Wood, Richard Peters, E. C. Felton, Felton Bent, P. J. McEntee, J. J. Burleigh and Luther S. Bent. The officers of the company are: President, Felton Bent; secretary and treasurer, Richard Peters, Jr.; superintendent, P. J. McEntee; assistant superintendent, J. F. Coale. R. C. Appleby is sales agent.

The Wehrle Stove Company of Newark, Ohio, have commenced work on their large foundry and expect to have it in operation by July. They recently decided to locate at Newark through the efforts of the Newark Board of Trade.

At a recent meeting of the stockholders of the Marion Malleable Iron Works, Marion, Ind., the following officers were elected for the ensuing year: W. F. Gurley, Troy, N. Y., president; John C. Haswell, Marion, vice-president and general manager; George A. Bell, Jr., Marion, secretary and treasurer; J. E. Michael, Marion, superintendent. It was announced at the meeting that the company are in good financial condition and that improvements to the plant will be made in the near future, the additions to include a 14-ton melting furnace, work on which will be begun at once. The report that the plant would be moved from Marion because of an insufficient supply of gas is denied by the company, who announce that other fuel will be provided at such times as it is impossible to secure gas.

The Fraser & Jones Company, Syracuse, N. Y., will build another addition to their foundry and make other improvements which will involve an expenditure of \$10,000. No new machinery will be required.

The Wilkes Foundry Company of Toledo, Ohio, have awarded a contract to Julius Comte for the extension of their foundry. The new building will be a one-story brick, and will cost about \$20,000. Plans for the addition were prepared by George Mills.

Bridges and Buildings.

The Worden-Allen Company, manufacturers of steel structures, Milwaukee, Wis., have entered into a contract for about 6 acres of land located on Lake street, just north of the city limits, and have agreed to begin the construction of a manufacturing plant to cost at least \$30,000.

The Phoenix Iron Company of Phoenixville, Pa., are now making the largest girders they ever manufactured. They are 98 feet 10½ inches by 9 feet 7½ inches wide and will be used in bridge construction work by the Southern Pacific Railroad Company. The girders weigh 57 tons each and 18 cars will be required to carry the six girders to their destination.

Fires.

The works of the Dauphin Bridge Company, Harrisburg, Pa., were destroyed by fire March 5, entailing a loss of about \$40,000, with insurance of \$20,000. The company have not decided whether the works shall be rebuilt. A number of large buildings in the Harrisburg district, for which the structural iron was being made at the Dauphin works, will be delayed by the fire, including the main building of the Harrisburg Boiler & Mfg. Company's plant, which was recently destroyed by fire, and the new passenger station of the Philadelphia & Reading Railroad.

The plant of the Preston Tumbler Company, near Terra Alta, W. Va., was recently destroyed by fire. The loss is about \$60,000.

The Capital City Woolen Mills, Des Moines, Iowa, were destroyed by fire March 8, entailing a loss of about \$60,000.

The plant of the Roband Tobacco Company, Henderson, Ky., was burned March 8. The loss will reach \$75,000.

The large machine, carpenter and blacksmith shops of the Philadelphia Coal & Iron Company, at Lincoln Colliery, Pottsville, Pa., were destroyed by fire March 4.

The plant of the Iron City Tool Works, Limited, at Pittsburgh, was destroyed by fire last week. William H. Hays, chairman of the concern, states that the plant will be rebuilt on the old site at Thirty-second and Smallman streets, in that city, as soon as the losses from the fire are adjusted. The concern are manufacturers of railroad track and mining tools.

Hardware.

The Ground Hog Plow & Foundry Company, Clarksville, Tenn., are making arrangements to improve their plant. They intend erecting a power house to operate all their machinery by electricity. They will put in a direct connected generator and would like to hear from manufacturers of such machinery. The Tennessee Central Railroad are running a spur into the yards of the company.

The Babbitt-Richards Company, Clayville, N. Y., have erected an addition to their mill, giving them about three times their former floor space. The company manufacture fine wire of all metals except iron and steel, and their plant is equipped with modern machines and appliances for wire drawing.

The Yost Electric Mfg. Company, Toledo, Ohio, have purchased a building site on Brown avenue and are planning to erect a factory for the manufacture of their electric lamp sockets and lawn sprinklers. Contract for the erection of the buildings has been placed with James Hales, Toledo. At present the Yost company are occupying a portion of the old Yost bicycle factory, which has been bought by the Toledo Machine & Tool Company.

"Friend" Mfg. Company, Gasport, N. Y., manufacturers of the Friend spray pump and special spraying outfits of any capacity, have lately built an addition to their factory, a step necessitated by the increasing demand for their product.

Champion Safety Lock Company, formerly of Cleveland, have recently removed to Geneva, Ohio, where they bought the plant of the Knapp & Pratt Mfg. Company, which they occupied after making extensive improvements and thoroughly equipping it with modern machinery and appliances for the manufacture of light hardware. The company have increased their lines and are now in a position to take care of business promptly.

Miscellaneous.

The Byard-Judd Company of Warren, Ohio, have been incorporated with \$25,000 capital stock, to manufacture sheet metal and wire products. Incorporators: W. C. Winfield, A. G. Judd, George W. Byard, Warren Woods and C. F. Judd.

The American Charcoal Company, at a meeting of the stockholders held recently, voted to remove their principal office and place of business from Binghamton, N. Y., to Buffalo.

The National Smoke Preventer Company of Dayton, Ohio, have established offices in rooms 401, 402 Ferguson Building, Pittsburgh.

The Alden Rubber Company of Akron, Ohio, have increased their capital from \$110,000 to \$220,000, and are planning the erection of additions to more than double their capacity. The improvements will include a large power plant.

Pig Iron Production Increasing.

Some Accumulation of Stocks.

The capacity of the blast furnaces has been increased by the blowing in of a number of stacks and by a somewhat better supply of raw material to some of them. The transportation troubles still continue, however. At the beginning of this week the United States Steel Corporation had 11 furnaces out of blast, four of them for repairs, which might have been deferred but for inability to keep even furnaces in the best of shape operating steadily. At the same time the corporation had about 250,000 tons of coke at the ovens, which it has been impossible to move.

Stocks have accumulated somewhat during the month, chiefly at Southern furnaces. A part of this added stock is in the form of lower grades and off irons, but the main trouble has been that the furnaces are not getting enough cars to ship all that they ought to.

The weekly capacity of the furnaces in blast on March 1 compares as follows with that of the preceding periods:

	Total capacity per week.	Coke capacity per week.	Charcoal capacity per week.
	Gross tons.		
March 1, 1903.....	355,333	348,024	7,309
February 1.....	343,111	335,339	7,772
January 1.....	353,800	346,073	7,727
December 1, 1902.....	343,817	336,617	7,200
November 1.....	337,550	330,110	7,449
October 1.....	345,048	337,837	7,211
September 1.....	335,189	328,243	6,946
August 1.....	336,465	328,745	7,720
July 1.....	350,890	343,250	7,640
June 1.....	344,748	337,492	7,256
May 1.....	352,064	337,627	6,437
April 1.....	337,424	331,140	6,284
March 1.....	323,028	316,039	6,989
February 1.....	332,045	325,440	6,605
January 1.....	298,460	291,992	6,468
December 1, 1901.....	324,761	317,358	7,403
November 1.....	320,824	313,775	7,049
October 1.....	307,982	300,538	7,444
September 1.....	299,861	293,256	6,605
August 1.....	303,847	297,269	6,578
July 1.....	310,950	303,793	7,157
June 1.....	314,505	306,391	7,514
May 1.....	301,125	293,915	7,210
April 1.....	296,676	288,766	7,910
March 1.....	292,899	284,825	8,074
February 1.....	278,258	269,923	8,335
January 1.....	250,351	243,254	7,097
December 1, 1900.....	228,846	222,067	6,779
November 1.....	215,304	207,381	7,923
October 1.....	223,169	214,921	8,248
September 1.....	231,778	223,551	8,227
August 1.....	244,426	236,131	8,295
July 1.....	283,413	274,921	8,492
June 1.....	296,376	288,771	7,605
May 1.....	293,850	286,956	6,894
April 1.....	289,482	281,644	7,838

We estimate the production, month for month, by districts as follows:

Monthly Pig Iron Production.					
October, November, December, January, February.					
	1902.	1902.	1902.	1903.	1903.
New York....	30,105	28,912	34,829	33,071	34,291
New Jersey....	8,375	14,218	17,432	17,378	12,791
Schuylkill....	31,915	41,129	46,527	49,007	41,349
Lehigh....	28,661	39,580	53,853	58,687	57,628
Susq and Leb-anon....	37,849	38,225	39,945	41,147	38,180
Pittsburgh....	380,261	359,662	368,851	360,795	328,709
Shenango....	112,825	93,186	110,363	111,098	111,725
West Penn....	83,827	77,326	89,767	93,777	86,037
Md., Va. and Ky....	84,759	90,074	85,357	79,390	83,500
Wheeling....	80,791	59,149	71,990	53,907	56,180
Cent. and No. Ohio....	113,842	109,263	106,032	90,757	90,575
Mahoning V....	112,978	107,838	124,658	107,510	112,678
Hanging Rock and Hocking Valley....	27,026	27,656	31,289	26,707	30,123
Ill., Wis., Minn., Mo. and Col....	189,970	172,485	170,708	170,880	147,179
Alabama....	116,337	137,289	142,281	136,907	120,479
Tennessee, No. Carolina and Georgia....	41,422	37,887	43,363	41,768	40,518
Charcoal pig....	1,480,941	1,432,879	1,537,245	1,472,788	1,392,031
	33,037	31,544	33,679	34,348	28,742
Totals....	1,513,978	1,464,423	1,570,924	1,507,136	1,420,773

Coke and Anthracite Furnaces in Blast.

Location	Number of furnaces.	March 1.		February 1.	
		Number of stacks.	in blast.	Capacity per week.	Number in blast.
New York.....	15	10	10,193	9	7,468
New Jersey.....	6	5	4,000	4	3,647
Spiegel.....	2	3	466	2	277

Pennsylvania :					
Lehigh Valley.....	27	23	13,300	24	13,252
Spiegel.....	1	1	115	1	127
Schuylkill Valley.....	14	12	10,026	13	10,068
Low. Susquehanna.....	10	7	5,844	7	4,774
Lebanon Valley.....	12	5	3,696	5	3,639
Pittsburgh District.....	32	79,101	32	83,420	
Spiegel.....	3	3	2,710	3	3,174
Shenango Valley.....	19	16	25,919	16	24,248
W. Pennsylvania.....	21	18	21,509	17	21,175
Maryland.....	5	4	6,294	3	4,457
Wheeling District.....	11	8	13,883	9	12,172

Ohio :					
Mahoning Valley.....	15	15	28,109	14	24,276
Cent. and North.....	14	11	22,646	12	21,310
Hocking Valley.....	3	2	695	2	452
Hanging Rock.....	11	10	6,809	10	5,576

Illinois.....	18	13	27,049	14	27,000
Spiegel.....	2	2	1,112	1	1,128
Minnesota.....	1	1	1,083	1	938
Wisconsin.....	5	4	3,024	5	3,708
Missouri.....	1	1	669	0	472
Colorado.....	3	3	4,414	2	3,668
Spiegel.....	1	0	0	1	264

The South :					
Virginia.....	23	19	12,449	17	11,361
Kentucky.....	7	6	2,500	5	2,108
Alabama.....	40	34	30,125	33	30,500
Spiegel.....	1	0	0	1	251
Tennessee.....	16	15	9,434	15	9,187
Georgia.....	1	1	600	0	0
North Carolina.....	1	1	250	1	244

Totals..... 337 284 348,024 279 335,339

There were blown in during February one Lackawanna at Buffalo, Oxford in New Jersey, Rebecca in Western Pennsylvania, Blue Mountain in Maryland, Big Stone Gap and West End in Virginia, Paducah in Kentucky, Rising Fawn in Georgia and one Alice in Tennessee. There were blown out or banked on March 1 Tidewater at Chester, Pa., one Bethlehem, one Lucy at Pittsburgh, Atlantic in the Shenango Valley, Martin's Ferry in the Wheeling district, one Bay View of the Illinois Steel Company and one Bessemer in Alabama.

The status of the charcoal furnaces was as follows:

Location	Number of furnaces.	March 1.		February 1.	
		Number of stacks.	in blast.	Capacity per week.	Number in blast.
New England.....	7	1	96	2	183
New York.....	3	1	435	2	476
Pennsylvania.....	5	0	0	1	23
Maryland.....	1	0	0	1	117
Virginia.....	3	1	40	1	40
Ohio.....	8	1	25	2	85
Kentucky.....	3	0	0	0	0
Tennessee.....	1	1	50	0	0
Georgia.....	4	2	422	3	811
Alabama.....	5	4	1,168	5	1,212
Michigan, Missouri and Wisconsin.....	11	10	5,073	10	4,625
Texas.....	4	0	0	1	100
Washington.....	1	0	0	1	100

Totals..... 56 21 7,309 28 7,772

Stocks.

The position of furnace stocks, sold and unsold, as reported to us, was as below on March 1, as compared with the preceding months, the same furnaces being represented as in former months. This does not include the holdings of the steel works producing their own iron:

Stocks.	Oct. 1.	Nov. 1.	Dec. 1.	Jan. 1.	Feb. 1.	Mar. 1.
Anthracite and Coke.....	62,651	62,261	85,606	92,560	106,297	144,394
Charcoal.....	13,250	9,597	8,689	7,335	13,344	14,959
Totals....	75,901	71,858	94,295	99,805	119,641	159,353

Many producers report that their accumulation of iron during February was due to inability to secure an adequate car supply for shipment.

The North Penn Iron Company have established an office in Room 818, Frick Building, Pittsburgh, in charge of the Somerville Engineering Company. The company are manufacturers of cranes.

The Structural and Shipyard Strikes.

It has been an open secret that labor unions who are attempting to dominate certain branches of the iron, steel and mechanical trades, have looked upon the prosperous conditions existing at present as propitious and were preparing demands for May 1. The strike epidemic has, however, taken hold of the structural iron workers and boiler makers earlier than was expected, and their plans are unfolding prematurely. Within the last week the International Association of Bridge and Structural Iron Workers have tangled themselves up with the business of the American Bridge Company and the Brotherhood of Boiler Makers and Iron Steamship Builders have made an onslaught on the New York Metal Trades' Association. The latter organization is composed of some 40 shipbuilders, repairers and boiler makers, whose plants are located in the vicinity of New York City.

There has been a good deal of confusion as to the cause of the structural workers' strike. Thus far it has been directed solely against the American Bridge Company. President Buchanan of the International Association of Bridge and Structural Iron Workers charges insincerity as to agreements against the American Bridge Company.

In answer to the charges of President Buchanan, the American Bridge Company on Tuesday issued a statement, saying in part: "Mr. Buchanan says that we started the fight in Buffalo, and that nonunion men were employed on a job there at the Lackawanna Steel Works. We employed union men until the job was taken off our hands. No nonunion men were employed by us. Regarding the expected forthcoming demand on May 1, the Association of Structural Iron Manufacturers will resist any exorbitant demands. The New York structural iron workers are getting 50 cents an hour, and that is the limit. The work of erection in buildings costs from 200 to 250 per cent. more than it did five or six years ago. Wages have about doubled, the work day is eight hours instead of ten, and the men do not turn out as much work in proportion as they did five or six years ago."

In sympathy with the strike of the International Association of Bridge and Structural Iron Workers, the Housesmiths' and Bridgemen's Union of New York went out. This affected buildings wherever the structural materials had been furnished by the American Bridge Company, even though the erecting contracts were in the hands of general contractors. The union has taken steps to prevent, if possible, the subletting of construction contracts.

Another strike affecting building operations is in force in New York, involving the portable hoisting engineers. The cause of this lockout was a refusal to continue to pay hoisting engine operators \$24 a week whether they worked or not. This matter has been referred for settlement to the Board of Building Trades of New York, with the consent of the contractors chiefly affected, the George A. Fuller Company. The board has notified the Elevator Constructors' Union that pending a settlement, its members must hoist no more building materials. If this notification is disregarded the union will be suspended.

The Boilermakers.

While the Brotherhood of Boilermakers and Iron Steamship Builders have made demands on the members of the Master Shipbuilders' Association throughout the country, and are preparing similar demands for all manufacturers of boilers, for a new wage scale to go into effect on May 1, the present trouble is purely a sympathetic movement. It was started at the plant of the Townsend-Downey Shipbuilding Company, Shooters Island, N. Y., more than a month ago over a refusal of the company to discharge two nonunion men. This company are members of the New York Metal Trades' Association, and the latter organization lent substantial aid in preventing the boilermakers from tying up the work at the yards. Appreciating the futility of their unaided efforts the boilermakers called for help, and on Tuesday all of the union boilermakers employed by members of the Metal Trades' Association were called out. Going still further, the carpenters, painters and all other

union men employed at the Townsend-Downey plant were called out. The sympathetic strikes were ordered by the Marine Trades Council. Though the general demands on the shipbuilders and others connected with the industry are scheduled to go into effect May 1, it is now thought that they will be made a part of the present issue, on account of the prevailing strike fever. The demands made for May 1 include the following:

An eight-hour workday for all outside jobs and a nine-hour workday for all inside jobs.

Saturday half holiday from June 1 to September 30.

Forty cents an hour for the minimum rate of wages and 45 cents an hour for fitters up.

Thirty-five and a half cents an hour and a nine-hour workday for boiler workers, riveters, chippers and calkers.

Forty cents an hour for fitters up and 45 cents an hour for flange turners, angle iron smiths and furnacemen when they work nine hours a day.

An agreement for a year, beginning May 1, 1903, and ending April 30, 1904.

Overtime on inside or outside work to be paid at the rate of two and a half times the ordinary time, every hour to count for two hours in work done on the Saturday half holiday.

None but members of the Brotherhood of Boiler Makers and Iron Ship Builders to be employed.

In complying with the orders of the Marine Trades Council to strike the blacksmiths employed in the Townsend-Downey plant directly violated the agreement they made last August. This went into effect September 1, and provided that there should be no striking for a year.

The New York Metal Trades Association issued the following bulletin from their headquarters, 203 Broadway, on Tuesday evening:

"Some of the Townsend-Downey men have gone out on strike in sympathy with the iron workers, who about a month ago struck against the employment by this company of nonunion men. Sympathetic strikes have been ordered against several members of the New York Metal Trades Association, in sympathy with the strikers at the Townsend-Downey Works, and iron workers have left the employment of several members of the association. The employers have held a consultation and unanimously decided that they will not submit to a demand requiring them to discharge all nonunion employees. Employers maintain their right to employ any workman who is willing to work. There is no question of wages involved."

Henry C. Hunter, the commissioner of the association, supplemented this statement by saying that some of the firms which have just brought their business to a paying basis will probably shut down altogether as a result of the strike. He also said that the wages paid here were higher than those paid anywhere else.

Notifications have been sent to all employers of boilermakers in this section of the country requesting the employers to take no action until they had consulted with the members of the Metal Trades Association.

Another statement sent to the employers at large was as follows:

"Perhaps the subject of greatest interest to the business men of New York is the recent action of members of this association and other firms engaged in the shipment and repairing industry in declining to take on new contracts, owing to the exorbitant demands and threatened strikes of the iron shipbuilders and boilermakers in New York and vicinity. Yards which heretofore did a large business in repairing and refitting vessels visiting this port are advising the masters of vessels to have their work done abroad. The shipbuilding industry is not alone suffering in this respect, but other trades dependent more or less upon the shipbuilding are being severely affected."

The officers of the New York Metal Trades Association are as follows: Charles H. Smith, president; H. N. Covell, vice president; Wallace Downey, treasurer; David Greenlie, secretary. The Executive Committee is composed of Wallace Downey, H. N. Covell, W. H. Atkinson, M. K. Bowman, and David Greenlie.

The mill of the Continental Iron Company at Wheatland, Pa., was not sold at public sale on March 10, as advertised. Appraisers were appointed to make a re-appraisal of the property, after which it will be sold.

The Iron and Metal Trades.

Our monthly blast furnace statistics show that production in February, a short month, was 1,420,773 tons, but that the Coke Iron capacity has increased during the month to 348,000 tons per week. Stocks accumulated to the extent of 38,000 tons, which was largely due to delay in shipments, caused by car scarcity.

In Southern Foundry Iron there has been some irregularity, and outside furnaces are now selling on the basis of \$18, Birmingham, for No. 2, while the Association furnaces continue to ask \$18.50. The tonnage placed, however, has not been large. There are reports that the Southern railroads contemplate an early advance in freight rates of 50c. a ton.

In Pittsburgh reports have been current of large purchases of Bessemer Pig, but so far as the leading interest is concerned they may be dismissed as incorrect, so far as the second half of the year is concerned. The interest in question is adhering to the policy of withholding from buying. Other producers, however, have purchased largely of Bessemer and Basic Pig.

Open Hearth Steel makers have been very active lately in hunting for material and there are reports, which cannot be fully verified, that considerable quantities of foreign Basic Pig, Low Phosphorus Iron, and Melting Scrap have been ordered, and that more tonnage is pending. Some large orders for Spiegeleisen are also said to have been placed.

The higher range of values in Wire, Tin Plates and Nails has encouraged renewed buying on the part of those independent mills who must rely upon the open market for Billets, Slabs and Tin Plate Bars, and quite a tonnage of foreign Steel has been placed in New England and in Eastern and Central Pennsylvania, with some larger inquiries pending in several of the districts into which foreign material can penetrate. The foreign markets are stiffer and importers are now asking from \$29 to \$29.50, ex-ship, for Steel, with buyers willing to place orders at \$28.50.

Additional orders for Steel Rails have been placed East and West, and it looks as though there will be a serious congestion of work. Some of the railroads are again turning to foreign markets for their requirements and there are some large inquiries in the market.

The tonnage of Structural Steel being placed is quite liberal and some very good additional work is coming out. It is believed that the differences between the bridge builders and the men are not serious enough not to be overcome at an early date.

In spite of the enormous tonnage of Plates which the mills have taken, some concessions are being made in Eastern Pennsylvania. There is also some talk of foreign Plates having been bought for American account.

There have been some large sales of Skelp in the Pittsburgh market lately, the tonnage aggregating 30,000 tons. Some of the outside Pipe mills are asking slightly higher prices.

Copper has continued its advance, now having reached 14.50c. Lead has been put up to 4.35c.

A Comparison of Prices.

**Advances Over the Previous Month in Heavy Type,
Declines in Italics.**

At date, one week, one month and one year previous.

PIG IRON: Mar. 11, Mar. 4, Feb. 11, Mar. 12,
1903. 1903. 1903. 1902.

	Mar. 11,	Mar. 4,	Feb. 11,	Mar. 12,
Foundry Pig No. 2, Standard, Philadelphia	22.25	22.25	22.25	18.50
Foundry Pig No. 2, Southern, Cincinnati	21.25	21.75	21.25	15.00
Foundry Pig No. 2, Local, Chicago	23.00	23.00	23.00	18.00
Bessemer Pig, Pittsburgh.....	21.85	21.85	21.35	17.25
Gray Forge, Pittsburgh.....	20.75	20.75	20.50	17.00
Lake Superior Charcoal, Chicago	26.50	26.50	26.50	20.50

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh.....	30.50	30.00	30.00	31.00
Steel Billets, Philadelphia....	*27.75	*28.00	*28.00	32.50
Steel Billets, Chicago.....	31.50	*31.50	*30.50
Wire Rods, Pittsburgh.....	36.50	36.00	35.50	36.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago.....	18.25	18.00	18.00	17.00
O. Steel Rails, Philadelphia....	21.25	21.25	20.75
O. Iron Rails, Chicago.....	24.00	24.00	24.00	24.00
O. Iron Rails, Philadelphia....	24.50	24.50	23.50	22.00
O. Car Wheels, Chicago.....	24.00	24.00	24.00	18.00
O. Car Wheels, Philadelphia....	24.50	24.50	22.75	17.50
Heavy Steel Scrap, Pittsburgh..	21.00	20.50	21.00
Heavy Steel Scrap, Chicago....	18.25	18.50	18.00	16.50

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia.	1.93½	1.93½	1.93½	1.82
Common Iron Bars, Chicago...	1.86½	1.86½	1.80	...
Common Iron Bars, Pittsburgh.	1.80¾	1.80	1.80	1.70
Steel Bars, Tidewater.....	1.75	1.75	1.75	1.75
Steel Bars, Pittsburgh.....	1.60	1.60	1.60	1.60
Tank Plates, Tidewater.....	1.95	2.00	2.10	1.78
Tank Plates, Pittsburgh.....	1.60	1.60	1.60	1.60
Beams, Tidewater.....	1.75	1.75	1.75	1.85
Beams, Pittsburgh.....	1.60	1.60	1.60	1.70
Angles, Tidewater.....	1.75	1.75	1.75	1.75
Angles, Pittsburgh.....	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh.	2.00	2.00	1.90	1.85
Skelp, Sheared Iron, Pittsburgh.	2.10	2.10	1.95	1.90
Sheets, No. 27, Pittsburgh....	2.65	2.60	2.65	3.00
Barb Wire, f.o.b. Pittsburgh....	2.60	2.60	2.50	2.90
Wire Nails, f.o.b. Pittsburgh...	2.00	2.00	1.90	2.05
Cut Nails, Mill.....	2.10	2.10	2.10	1.95

METALS:

Copper, New York.....	14.50	13.50	12.75	12.25
Spelter, St. Louis.....	5.00	4.90	4.85	4.10
Lead, New York.....	4.35	4.10	4.10	4.10
Lead, St. Louis.....	4.22½	3.97½	3.97½	4.05
Tin, New York.....	30.55	30.62½	29.20	26.50
Antimony, Hallett, New York...	6.75	6.62½	7.00	8.00
Nickel, New York.....	40.00	40.00	40.00	50.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York.....	3.90	3.99	3.79	4.19

* Foreign.

Chicago.

FISHER BUILDING, March 11, 1903.—(By Telegraph.)

The dragging market which has been experienced for Pig Iron has developed into a weaker feeling; at least some of the smaller producers have shown a disposition to accept lower prices, resulting in moderate sales, mainly for delivery during the balance of the first half of the year, but occasional sales have been made covering the second half on the same basis as for the first half. While the inquiry is more for Basic and Bessemer, the lower prices have brought out more buyers for Foundry grades. In Steel the principal feature has been the increased demand for Standard Rails. A large tonnage of Western business has been taken for Eastern mills and quite a number of the trunk lines that placed contracts some time since are now making applications to have their orders heavily increased. It now seems probable that the urgent demand for Billets and Bars, due to heavy sales of finished product, may compel the largest interest to transfer one of the mills now making Rails upon Billets and Bars. If this is done the outlook for Rails will be somewhat complicated and cause the carrying over of heavy tonnage into next year. The buying movement in Steel Bars is not anticipated until May or June. In Structural Material there is a heavy tonnage in sight and the demand for Plates is especially active. Sheets and Pipe continue to meet with a good demand also, and the scarcity of Old Material is even more emphasized than heretofore. Billets in this market are little better than nominal, there being a scarcity especially of Rerolling Billets.

Pig Iron.—There has been an improved demand for Foundry grades, but the inquiry is still largely for Bessemer and Basic Iron, with moderate sales. The tone of the mar-

ket is somewhat weaker, the small producers seeming to be willing to make concessions to induce purchases; this is especially true of Foundry Iron. In the aggregate there has been a fair volume of business, although individual transactions have been relatively small, yet sales of 500 to 1000 ton lots have been more frequent, deliveries extending over the second and third quarters, but mainly the balance of the first half of the year. A more ample Coke supply is reassuring to both foundries and furnaces, and it is now anticipated that one local furnace will blow in on March 15. The difficulties in obtaining cars for shipment of Iron, together with other drawbacks to transportation, are still felt throughout the market, but the tendency seems toward improvement rather than otherwise. Southern Silvery and Softeners are more freely offered and lower prices have been accepted. Standard Bessemer from the Valleys is being more freely offered in this section, causing keen competition in local Irons, resulting in concessions by furnaces. While the demand is still largely confined to the first half of the year, there have been occasional transactions covering the second half, several lots ranging from 500 to 1000 tons each of No. 2 Southern Coke Foundry having been sold on the basis of \$18, Birmingham. Among the sales have been several lots of 100 tons each and two lots of 200 tons each of No. 2 Southern Coke Foundry on the basis of \$18, Birmingham, for delivery within the next 60 days; several lots of 500 tons and two lots of 1000 tons No. 2 Southern at \$18, Birmingham, for delivery during the second and a portion of the third quarters; one lot of 1000 tons ditto at the same price for delivery during the second half; several 100-ton lots of Southern Silvery, 4 per cent. selling on the basis of \$20 and 5 per cent. at \$21, Birmingham; 3000 tons of Basic Iron in lots of 1000 tons each on the basis of \$18, Birmingham, for delivery within the next three months. The following are the prices current, f.o.b. Chicago, for delivery during the second and third quarters of the current year:

Lake Superior Charcoal.....	\$26.50 to \$27.50
Local Coke Foundry, No. 1.....	24.00 to 25.00
Local Coke Foundry, No. 2.....	23.00 to 24.00
Local Coke Foundry, No. 3.....	22.00 to 23.00
Local Scotch, No. 1.....	24.50 to 25.00
Ohio Strong Softeners, No. 1.....	26.30 to 27.30
Southern Silvery, according to Silicon.....	24.35 to 26.35
Southern Coke, No. 1.....	23.35 to 23.85
Southern Coke, No. 2.....	22.35 to 22.85
Southern Coke, No. 3.....	21.35 to 21.85
Southern Coke, No. 1 Soft.....	23.35 to 23.85
Southern Coke, No. 2 Soft.....	22.35 to 22.85
Foundry Forge.....	20.85 to 21.35
Southern Gray Forge.....	19.85 to 20.35
Southern Mottled.....	19.35 to 19.85
Southern Charcoal Softeners, according to Silicon.....	25.85 to 27.85
Alabama and Georgia Car Wheel.....	28.35 to 28.85
Malleable Bessemer.....	23.00 to 24.00
Standard Bessemer.....	23.50 to 24.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	31.30 to 32.30

Bars.—There has been no great activity in either Iron or Steel Bars during the week, and the heavy buying movement in Soft Steel Bars is not anticipated until May or June, much depending upon the attitude of labor. There have been quite liberal specifications of Steel on old contracts and some new business, 5000 tons or more, for delivery up to July 1; the aggregate tonnage has not been large. The independent Bar Iron interests, while they have not affected a merger, are working more in harmony and practically with an agreed price, few of the mills offering to sell below 1.90c., base, Chicago. Consumers, however, have been slow to pay the advance demanded, although in the aggregate there has been a fair volume of business, two lots of 500 tons and two lots of 1000 tons being reported for delivery extending into the third quarter of the year. One lot of 500 tons was sold for delivery up to July 15 on the basis of 1.80c., Chicago. There has been little inquiry for foreign material, and prices are nominal. The following are the prices current, f.o.b. Chicago, for domestic product, mill shipment: Bar Iron, 1.86½c. to 1.90c.; Soft Steel Bars, 1.76½c. to 1.86½c.; Hoops, 2.16½c. to 2.26½c.; Angles, 1.86½c. to 1.91½c., base. There has been an improved demand for shipment from local stocks and the market has remained steady, as follows: Bar Iron, 2.15c.; Soft Steel Bars, 2c. to 2.25c.; Angles, 2.50c., and Hoops, 2.40c., base, from store.

Structural Material.—Aside from the labor cloud, the outlook for Structural Material is better than at any time since the first of the year. A careful canvass of the situation shows a larger tonnage of Structural Material pending than even at this time a year ago. While the tonnage placed during the week has not been large, it has been of satisfactory proportions in the aggregate, several lots of 1000 tons and several contracts of 500 tons each having been placed by large interests. The demand from railroad companies is especially heavy. As soon as it is determined in how far Structural work will be affected by discontented labor consumers can place contracts with more intelligence. It is certain that both mills and contractors are determined to resist any further encroachment brought about by labor dictators. The following are the prices current at Chicago for mill shipment: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.;

Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. There has been a good demand for small lots from local stocks, and the market has remained strong on the basis of the following prices: Beams and Channels, 2¼c. to 2½c.; Angles, 2.25c. to 2.50c.; Tees, 2.30c. to 2.55c., at local yards.

Plates.—The market has continued strong, with an active demand especially from railroad companies, and although business during the week has been confined to small lots, the aggregate tonnage is between 7000 and 8000 tons. Prices remain firm, f.o.b. Chicago, mill shipment, as follows: Tank Steel, ¼-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.10c.; Marine, 2.10c. to 2.20c. The demand for shipments of small lots from local stocks has continued active, and the market has remained firm as previously quoted. The following are the prices current: Tank Steel, ¼-inch and heavier, 2.15c. to 2.20c.; Tank Steel, 3-16-inch, 2.25c. to 2.30c.; No. 8, 2.30c. to 2.40c.; Flange Steel, 2.40c. to 2.50c., all f.o.b. warehouse, Chicago.

Sheets.—The situation has changed but little during the week, there being a good demand for both Black and Galvanized, and although both the combination and independent mills are well supplied with orders there is a keen competition and official prices are still shaded. The following are the prices current for mill shipment, carload lots, f.o.b. Chicago, although not strictly adhered to: No. 20, 2.50c. to 2.55c.; Nos. 22 and 24, 2.55c. to 2.65c.; No. 26, 2.65c. to 2.75c.; No. 27, 2.75c. to 2.85c.; No. 28, 2.85c. to 2.95c. Small lots from stock have continued to sell at 15c. to 20c. above mill prices. Galvanized Sheets have been in fair demand and steady on the basis of 75 and 10 and 5 discount for mill shipments and 75 and 5 for shipment from local store.

Cast Pipe.—The Western market is dull, there being few large contracts pending and there being less demand even from railroads and mining interests. While the following prices are current for small lots, it is probable that round lots could be purchased at some concession. Manufacturers quote, f.o.b. Chicago, as follows: 4-inch, \$34; 6-inch, \$33, and 8-inch, \$32 for Water Pipe and \$1 per ton higher for Gas Pipe.

Billets.—With the exception of the jobbing trade the market has been dull, and for Rerolling Billets prices are entirely nominal, there being a great scarcity of domestic and the higher prices demanded for foreign curtailing business. Bessemer Billets are nominally quotable at \$31.50, delivered Chicago, for delivery during the second quarter of the year, either domestic or foreign. There has continued to be a fair inquiry for Open Hearth Forging Billets, several 100-ton lots selling at prices ranging from \$34 to \$38, with specially small sizes bringing as much as \$10, according to analysis, buyer and time of delivery.

Merchant Pipe.—The market has changed but little if any during the week, but the tendency has been toward a hardening of prices, some independent mills withdrawing prices and others advancing quotations, so that now there is little difference between the official discounts and prices made by independent mills. Specifications on old contracts have continued heavy and there has been a fair volume of new business. The following is the official schedule of discounts for carload lots, Chicago, base, random lengths, mill shipment:

Guaranteed Wrought					
Steel Pipe.	Iron.	Black.	Galvd.	Black.	Galvd.
Black.	Galvd.	Per cent.	Per cent.	Per cent.	Per cent.
1/8 to 3/4 inch.....	66.35	56.35	63.35	53.35	
1/2 inch.....	68.35	58.35	65.35	55.35	
3/4 to 6 inches.....	73.35	63.35	70.35	60.35	
7 to 12 inches.....	71.35	61.35	68.35	58.35	
Less than carloads, 12½ per cent. advance.					

Boiler Tubes.—There has been a fair volume of business and a firm market, official prices being well sustained. The following are the discounts current for carload lots, Chicago, mill shipments:

Steel.	Iron.
1 to 1½ inches.....	43.35
1½ to 2½ inches.....	55.85
2½ to 5 inches.....	60.85
6 inches and larger.....	55.85
Less than carloads, 12½ per cent. advance.	

There has been a fair order trade from local stock and the market has remained steady at the following schedule of discounts:

Steel.	Iron.
1 to 1½ inches.....	35
1½ to 2½ inches.....	47½
2½ to 5 inches.....	55
6 inches and larger.....	47½

Merchant Steel.—The difficulty in making shipments on contracts is still the prominent feature and likely to be for some time to come. The volume of new business is not large, but there continues to be a fair demand for small lots. Prices remain firm for mill shipments, as follows: Smooth Finished Machinery Steel, 2.01½c. to 2.11½c.; Smooth Finished Tire, 1.96½c. to 2.11½c.; Open Hearth Spring Steel, 2.66½c. to 2.76½c.; Toe Calk, 2.31½c. to 2.46½c.; Sleigh Shoe, 1.86½c. to 1.96½c.; Cutter Shoe, 2.41½c. to 2.61½c. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 8c. for mill shipments: Specials, 12c. upward.

Rails and Track Supplies.—Considering the very heavy tonnage already booked, the demand from Western roads for Standard Sections is surprising. One contract for a Southwestern road for between 40,000 and 50,000 tons has been placed with Eastern mills during the week and a number of small contracts aggregating upward of 6000 tons also have been placed for nearby delivery. Between 75,000 and 80,000 tons are said to have been placed during February and the prospects are that even a heavier tonnage will be booked during the current month. Five or six different lots ranging from 500 to 1200 tons have been placed during the past few days, but with scarce an exception the orders have gone to Eastern mills. The demand for Light Sections has also continued on a liberal scale. The current production of local mills, which aggregates about 60,000 tons a month, is fully engaged. The market could scarcely be stronger, but prices remain as previously quoted, \$28 for standard and \$27 for second quality, mill shipments, while Light Rails are quotable at \$35 to \$40, according to weight, although premiums are asked and obtained for small lots for early shipment. Track Supplies have continued active and strong at full prices. The following are the prices current: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.25c.; Square Nuts, 2.95c. to 3.10c.

Old Material.—A stronger tone has developed for Railroad Wrought, Forge and Machine Shop Turnings, with higher prices asked and obtained; but the market for Heavy Steel Melting Scrap and Old Rails has been easier, although the offerings have not been large, there being less demand. The market as a whole is very strong and the tendency is toward higher rather than lower prices. The following are the prices current per gross ton, Chicago:

Old Iron Rails.....	\$24.00 to \$24.50
Old Steel Rails, mixed lengths.....	18.25 to 18.50
Old Steel Rails, long lengths.....	22.00 to 22.50
Heavy Relaying Rails.....	31.00 to 31.50
Old Car Wheels.....	24.00 to 24.50
Heavy Melting Steel Scrap.....	18.25 to 18.50
Mixed Steel.....	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates.....	\$21.00 to \$22.00
Iron Car Axles.....	24.50 to 25.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	19.50 to 20.00
No. 2 Railroad Wrought.....	18.00 to 18.25
Shafting.....	20.00 to 21.00
No. 1 Dealers' Forge.....	16.50 to 17.00
No. 1 Busheling and Wrought Pipe.....	14.00 to 14.50
Iron Axe Turnings.....	14.00 to 14.50
Soft Steel Axe Turnings.....	14.50 to 14.75
Machine Shop Turnings.....	14.00 to 14.25
Cast Borings.....	10.00 to 10.50
Mixed Borings, &c.....	10.50 to 11.50
No. 1 Boilers, cut.....	14.50 to 15.00
Heavy Cast Scrap.....	18.00 to 18.50
Stove Plate and Light Cast Scrap.....	13.50 to 14.00
Railroad Malleable.....	16.25 to 16.50
Agricultural Malleable.....	15.50 to 16.00

Metals.—The market for Copper has continued strong and prices have further advanced sharply. Lake is now held at 14c. in carload lots and 14½c. in a jobbing way, but the high prices seem to have checked the demand. Pig Lead has remained firm with a fair demand, but it seems almost impossible to obtain cars to make satisfactory shipments on either old or new business. Prices remain unchanged at 4.05c. in 50-ton lots, 4.07½c. in carload lots and 4.10c. in a jobbing way. Spelter has remained firm with a fair volume of business at 4.90c., Chicago. Sheet Zinc has remained quiet but firm at 6¼c. in lots of 600 tons and over. Old Copper has sympathized with the market for Ingot and higher prices are now demanded. Heavy Cut Copper is held at 12c., Red Brass at 12c., Copper Bottoms at 10¾c., Lead Pipe at 3.90c., Zinc at 3.90c., spot.

Coke.—There has been a further increase in both the supply of Furnace and Foundry Coke available in this market and a somewhat easier tone has developed, but prices have not changed essentially. Ovens are still asking \$5.50 for contracts covering the entire year, but there is little business being done on this basis. Sales of single car lots on track, Chicago, of Virginia Coke are made at \$9.50 to \$10, while Connellsville is normally quotable at \$10.50.

Philadelphia.

FORREST BUILDING, March 10, 1903.

There is very little change to notice in the conditions surrounding the Iron market. The volume of business is satisfactory, and prices are steady, but the feeling is still somewhat uncertain. The advancing tendency in foreign markets has been checked, although it is believed that orders for large lots of both Iron and Steel were placed during the past two or three weeks. The market is rather uneven, however, some descriptions, such as Low Phosphorus, Basic and Bessemer Irons, being in good demand at higher prices, while Foundry Irons are doing little beyond holding their own. As a general proposition it does not appear likely that prices will show much change from those now ruling. Reasons might be presented which would show either an upward or a downward tendency, but as reasons on one side offset

reasons on the other, a fair inference would be that there will be no material change in either direction until conditions change. There are better railways facilities, easier fuel conditions and a larger consumption, besides higher prices for foreign material. On the other hand, we are at about the highest production on record, and to maintain the equilibrium it is absolutely necessary to have unrestricted consumption. This unfortunately is one of the things that is not as secure as could be desired. The strike among the structural workers is an intimation that there is a possibility of serious drawbacks; and while it is difficult to say how far it will extend, it may cause a great deal of trouble at a critical period and thereby change the entire situation. For the present, however, it may be said that the disposition appears to be to regard current rates as reasonably safe, although for deliveries during the last half of the year quotations are lower than for those from now on to July.

Pig Iron.—As far as Foundry grades are concerned, the market is not specially interesting, but prices are steady and the demand fairly active. Production appears to be increasing, and deliveries are not hard to get, although there are no indications of surplus beyond what is required to deliver on old contracts and meet current requirements, with prices on about the same level as last week. Mill Irons have been sold at all sorts of prices from \$19, delivered, up to \$20.50. This class of Iron varies so much, and is required for such a variety of purposes that prices have to be graded accordingly, but a fair average for a good Mill Iron would probably be from \$19.50 to \$20, delivered in buyers' yards. Special movements have been mostly for Steel making material, large sales having been made at advancing prices. Reports are current of considerably higher prices for Low Phosphorus; sales were recently made at a trifle over \$22, ex-ship, asking prices to-day being \$1 advance on that figure. Basic Iron is scarce, with sales at about \$20, f.o.b. furnace. The average outcome of the week's business, therefore, is unchanged prices for Foundry and Mill Irons, but firm and higher figures for Steel making materials. Some business has been done in foreign Pig, both German and English, but there was no quotable change in prices, which are about as follows for deliveries in buyers' yards:

No. 1 X Foundry.....	\$23.50 to \$24.50
No. 2 X Foundry.....	22.25 to 22.50
No. 2 Plain.....	21.50 to 22.00
Gray Forge.....	19.50 to 20.50
Basic.....	20.00 to 20.50
Middlesbrough, No. 3.....	21.00 to 21.50
Scotch.....	22.50 to 23.50

Cargo lots c.i.f.

Low Phosphorus.....	21.50 to 22.00
Bessemer.....	20.25 to 20.50
Middlesbrough, No. 3.....	18.50 to 18.75

Billets.—There is little or nothing doing in American Steel, except for special purposes, on which quotations cannot well be given in an article of this kind. Ordinary Steel, however, would be \$32 to \$33 in buyers' yards; German Steel, \$27.75 to \$28.50, ex-ship, duty paid, price according to quantity, date of shipment, terms of payment, &c. It is understood that a good deal of business has been closed for American account, but details are not available at the present time.

Plates.—There is a fairly good demand, but owing to encroachments from the West, prices are a shade easier. There is no scarcity of business, but enlargements and extensions at some of the leading mills lead to a desire to secure as much work as possible, and this no doubt has caused some of them to make concessions of 2½c. to 5c. per 100 lbs. Prospects for a large business are in no way impaired, however, although there is some talk of foreign Plates having been purchased for American account. The following are fair average quotations for carload lots as a minimum quantity, for Philadelphia delivery or its equivalent, viz.: Small lots, 2.10c.; carload lots, ¼-inch and thicker, 1.95c. to 2c.; Universals, 2c.; Flange, 2.10c. to 2.15c.; Fire Box, 2.20c. to 2.25c.; Marine, 2.30c. to 2.35c.

Structural Material.—There is no special change to note at present, although there is some fear that if the strike among bridge workers extends it will have a bad effect on the market. For the present there is a fair demand and mills are well supplied with orders, and if specifications are sent in as expected there will be as much work as the mills will be able to get out. Prices are unchanged as follows—viz., Philadelphia delivery: Beams, Angles or Channels, ordinary sizes, 1.73½c. to 1.78½c., carload lots, as a minimum.

Bars.—The demand is fair and as a rule prices are well maintained, although it is in some cases claimed that business has been done at less than combination prices. Generally speaking, however, there is a very fair business at rates as last quoted—viz.: Steel Bars at 1.73½c., base; but for spot deliveries local mills get, say, 1.85c. to 1.90c. Re-refined Iron, as before, is quoted at 1.93½c. to 1.95c., carload lots, minimum quantities.

Sheets.—The demand is improving and prices have an upward tendency and average about a tenth higher than a month ago. Mills are running full, but are not accumulating much stock.

Old Material.—There is a good demand, but it is difficult to find material unsold, so that actual transactions have not been important during the past few days. Bids and offers are about as follows for delivery in buyers' yards:

Old Steel Rails.....	\$21.25 to \$21.75
Heavy Steel Scrap.....	20.75 to 21.50
Low Phosphorus Scrap.....	27.00 to 28.00
Old Steel Axles.....	26.00 to 27.00
Old Iron Rails.....	24.50 to 25.00
Old Iron Axles.....	30.00 to 31.00
Old Car Wheels.....	24.50 to 25.00
Choice Scrap, R. R. No. 1 Wrought.....	23.50 to 24.00
Country Scrap.....	21.00 to 22.00
Machinery Scrap.....	20.00 to 21.00
No. 2 Light Scrap.....	18.00 to 19.00
No. 2 Light (Ordinary).....	15.00 to 16.00
Wrought Turnings.....	16.50 to 17.00
Wrought Turnings, Choice Heavy.....	17.50 to 18.00
Cast Borings.....	11.00 to 11.50
Stove Plate.....	15.00 to 16.00

Pilling & Crane have been appointed sole agents in the United States for the Nova Scotia Steel & Coal Company, and to facilitate that branch of their business have opened an office in the Board of Trade Building, in Boston, Mass. This Coal will be supplied from the old Sydneey mines and has an established reputation in the New England States.

Charles E. McInnes & Co. have opened an office at 100 William street, New York, which will be in charge of E. T. Edwards. The specialties of this firm are Steel in its various forms, finished or partly finished, of which during the past year they have made large and satisfactory imports.

The offices of the Pulaski Iron Company and of the Virginia Mining Company have been removed to the Real Estate Trust Building.

Cleveland.

CLEVELAND, OHIO, March 10, 1903.

Iron Ore.—It is beginning to look very much like a duplication of the beginning of the last season of navigation from the trend affairs have taken this year. The Ore Association are now in a tangle over the question of prices, which may last for three or four days yet, and may possibly not end before the week is out. It is generally admitted that the major points have been settled, but some of the minor details are causing no end of difficulty. An amicable settlement, however, is expected soon. Considerable consternation was created among vessel owners the past week by the announcement that the ice conditions in the rivers connecting the chain of lakes indicate a breaking up soon enough to permit boats to pass through to Lake Michigan about April 1 and to Lake Superior about April 10. This statement seems to dissipate hopes of a very short season for the vessel owners, and therefore works against them in their effort to obtain higher rates than were paid last year. Expecting a short season they had made their arrangements with the seamen and other help on shipboard on the basis of the possible rates to be obtained. Now the vessel interests are committed to a policy of higher prices for handling the Ore. In addition the longshoremen are in conference this week, and expect to demand and obtain higher rates for handling the Ore. This also comes off of the vessel. The movement from the lake docks to the furnace stock piles has been started with greater energy than has prevailed all winter. The reason is that the embargoes have partly been lifted on most lines and entirely removed from others, thus permitting a freer movement of material.

Pig Iron.—The Pig Iron market is in a peculiar condition. While the bidding for spot Iron has been liberal, some of the furnaces are finding it necessary to look for business. This has been taken by some of the consumers to indicate that there is plenty of material, and they are waiting for the decline in prices which they seem to think is imminent. While Iron for first half delivery is getting scarce, the consumers do not seem to be concerned. Prices have held at \$24 to \$25 for No. 2, at Valley furnace. Some few lots have been sold within the last few weeks for first half delivery, and this is going at the same price at which the former sales for that period were made—namely, \$23. Deliveries have slightly improved, due to the change in weather conditions. The furnaces producing Basic Iron in this district are beginning to catch up on their old orders, but few are in position to make quotations for future delivery, especially for the first half of the year. Some not sold up after April 1 are beginning to let it be known that they will have material for sale. The result will probably be that some contracts will be closed before long. The prices which are heard most frequently now are \$20 to \$21 for first half delivery. The Bessemer producers are not doing anything as yet in the way of making prices on their material for second half delivery. There is a good deal of talk about pending contracts, but nothing definite has been done so far. It is generally understood now that the prices, when they have been made, will be about \$20, at Valley furnace. The Coke situation seems to be slightly improved.

Finished Iron and Steel.—The Rail trade is beginning to attract no small amount of attention. The extension, re-

building and repair of old lines and the construction of new ones are causing quite a demand. The electric lines are the center of this activity and promise a future market that is most encouraging to the Steel mills. This one branch during the past week has been responsible for orders aggregating 4000 tons and there are now inquiries in for something like 20,000 tons that will be placed within the next two weeks in all possibility. A number of projects which had asked for early shipment have delayed the movement of their material until later in the year, making room immediately for some new orders. Light Rails are also in demand and have been selling well. Quotations have not changed, Standard Rails bringing \$28 and the lighter Rails bringing \$36. The Bar trade is active now that the uncertainty as to price on Bar Steel has been removed. It seemed for a time that this price would break. One order of 2500 tons was closed and there is another for 2000 tons pending which will be closed during the week. Recent heavy sales here have gone into entirely different channels than implement works. The Bar Iron situation is stronger than ever. The market is buoyant on the 1.80c. basis and some of the larger mills have withdrawn their quotations altogether that they may be more choice in the orders that are being accepted. The Plate trade has been booming and elements of weakness, which pervaded the market earlier in the year, have entirely disappeared. The larger mills have been out of the market for some time and the smaller mills are now having all that they can do and are getting without controversy the prices which have been asked hitherto—namely, 2c. at the mills. The larger mills are naming 1.60c., Pittsburgh. The Sheet trade is beginning to be even so much stronger. Some of the plants producing Galvanized Sheets report that they have never had such a showing of business on their books, and others are beginning to show the same condition. Black Sheets are likewise in larger demand. The question of price has been supplanted for that of delivery. The jobbers are having call for all of the material they can possibly furnish. The possibilities are that the market will be much stronger before April 1 and prices are expected to advance by that time. The quotations are unchanged, as follows: 3.10c. to 3.25c. for No. 27 out of stock; 2.85c. to 2.95c. at the smaller mills for Black Sheets, and 3.70c. for No. 27 Galvanized Sheets. The demand for Structural Steel is improving. Quotations continue to be 1.60c., Pittsburgh, from the larger mills and 1.75c. to 1.85c. from the smaller mills. Jobbers are getting 2.25c.

Old Material.—The market has been steady with orders coming in more freely than heretofore, but there is still some hesitancy. Prices have not changed, being: No. 1 Wrought, \$19.50, net; Iron Rails, \$25.50, gross; Iron Axles, \$20, gross; Wrought Turnings, \$19.50, net; Cast Borings, \$17.50, gross; Car Wheels, \$22.50, gross; Heavy Melting Steel, \$19, gross; Old Steel Rails, \$20, gross.

Cincinnati.

FIFTH AND MAIN STS., March 11, 1903.—(By Telegraph.)

As far as quite a degree of activity in Basic and Bessemer Iron could do it the dullness has been taken out of the Pig Iron market. Different places in the Central West and North have been buying extensively of those grades, and the selling has been largely participated in by agencies having their headquarters in Cincinnati. There has also been some inquiry and sale of Malleable Irons, chiefly at lake points. The situation, so far as Foundry Irons are concerned, is somewhat softer. Southern Foundry Irons are quoted lower by 50c. than they were a week ago, and the rumors of \$18 for No. 2 Iron, Birmingham basis, have been confirmed by about all the sales which have been made. These sales, however, are unimportant in amount of tonnage, and almost exclusively for prompt shipment. Business for the last half of the year in Foundry and Mill Irons is practically at a standstill, as it has been for some time past. The association furnaces (Southern) are still holding to the basis of \$18.50, Birmingham, but the selling is being done by outsiders on the basis of \$18. Both in Northern and Southern Foundry grades Iron for spot shipment is considered weaker than that for future delivery. Ideas in regard to Gray Forge are widely at variance, as they have been for some weeks. A sale of 3000 tons of this grade is reported upon pretty good authority to have been made on the basis of \$15.50, Birmingham, and the grade is being freely offered up to \$16. No. 4 Foundry has been and is still being offered on about the same basis. One of the features which is now troubling the market for Southern Iron is the uncertainty which rests with the question of freights. The railroads are understood to be agitating the matter, with a view of an additional raise, the claim being that they are not participating sufficiently in the general prosperity. In answer to which claim the Pig Iron men are vigorously protesting that the miserable service they are receiving is not worth what they are already paying for it, and that a further advance would be a matter of extreme injustice. A sale of 3500 tons of Southern Car Wheel is reported on the basis of \$24, Birmingham. Freight rates from the Hanging Rock district, \$1.15, and from Birmingham to Ohio River

points, \$3.25. We quote, f.o.b. Cincinnati, for delivery throughout the year, as follows:

Southern Coke, No. 1.....	\$21.75 to \$22.25
Southern Coke, No. 2.....	21.25 to 21.75
Southern Coke, No. 3.....	20.75 to 21.25
Southern Coke, No. 4.....	18.75 to 19.75
Southern Coke, No. 1 Soft.....	21.75 to 22.25
Southern Coke, No. 2 Soft.....	21.25 to 21.75
Southern Coke, Gray Forge.....	18.75 to 19.75
Southern Coke, Mottled.....	18.75 to 19.75
Ohio Silvery, No. 1.....	31.15 to
Lake Superior Coke, No. 1.....	24.15 to 25.15
Lake Superior Coke, No. 2.....	23.15 to 24.15
Lake Superior Coke, No. 3.....	22.15 to 23.15

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$27.25 to \$28.25
Lake Superior Car Wheel and Malleable	27.50 to 28.50

Plates and Bars.—The general market continues to show improved activity, with prices remaining practically unchanged. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.92c., with half extras; same, small lots, 2.20c., with full extras; Steel Bars, carload lots, 1.73c., with half extras; same, in small lots, 2.20c., with full extras; Plates, $\frac{1}{4}$ -inch, in carload lots, are still nominally 1.70c.; Plates, 3-16 inch, 1.80c.; Beams and Channels, 1.70c., base.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, March 11, 1903.

Pig Iron.—Reports of large purchases of Bessemer Iron by the United States Steel Corporation and Cambria Steel Company for shipment over the last six months of this year are incorrect. The Cambria Steel Company were inquiring about a week ago for a round lot of Low Phosphorus Iron, and there have been more or less negotiations between the Steel Corporation and the Bessemer Furnace Association regarding Iron for last half, but nothing definite has yet been done. The furnaces still owe the corporation a large tonnage of Bessemer Iron, which should have been delivered last year, but was not on account of shortage of Coke. Bessemer Iron for shipment up to July is \$21, at furnace, and for shipment over last six months is \$20 to \$20.50, at furnace. A sale is reported of 10,000 tons of Standard Bessemer Iron, 2000 tons a month, up to July at \$21, at furnace. There is a heavy demand for Basic Iron, and it is held at about \$21, at furnace. We note a better inquiry for Forge Iron, and it is firmer than for some time, being held at \$20.75 to \$21, Pittsburgh.

Steel.—The Steel market is very firm, and there is a scarcity of Billets and Sheet and Tin Bars for prompt shipment. Leading mills are short of Steel to operate their finishing mills. Bessemer Billets are \$30.50 to \$31, and Open Hearth, \$31 to \$33, depending on carbons. Sheet Bars are \$31, and Tin Bars about \$32, maker's mill.

(By Mail.)

The open weather of the past week or ten days has bettered the car situation somewhat, and deliveries of Coal and Coke, particularly the former, are better than for some time. However, the situation is still far from being satisfactory, and it will probably be three or four months yet before there is permanent improvement. Reports are going of heavy purchases of Bessemer Pig Iron by United States Steel Corporation and Cambria Steel Company for delivery in last half of this year. The former are said to have bought 140,000 tons, and the Cambria Steel Company 85,000 tons, but these sales have not been officially confirmed, and it is not believed have gone through. Bessemer Iron for shipment up to July is held firm at \$21, at Valley furnace, while for shipment over last six months \$20 to \$20.50, at furnace, is quoted. The Steel market is very firm, and the leading interest are said to be very short of Steel at a number of their finishing mills. Bessemer Billets are held at \$30.50 to \$31, Pittsburgh, and Open Hearth at \$31, maker's mill. Tonnage in Finished Iron and Steel is heavy, and on Structural Steel, Pipe and Bars, the mills are sold ahead for three or four months, and on Plates for a longer period. The whole situation is very strong, and with every indication that it will continue so throughout the rest of this year.

Muck Bar.—Domestic Muck Bar is held firmly at \$35 to \$36, and Eastern Bar at about \$34, Pittsburgh. There is a good deal of inquiry, and the market is very firm.

Steel Rails.—No large lots have been placed since our last report. The mills are sold up to October or longer, and the Lackawanna Steel Company may not have their plant at Buffalo completed as soon as expected, and for this reason some of their contracts may be placed with other mills. We quote at \$28, at mill.

Structural Material.—A general strike has been declared against the American Bridge Company by the International Association of Bridge and Structural Iron Workers, and as a result practically all of the work under way by this concern in the Pittsburgh district is tied up. It looks as though the trouble may be serious before it is settled. Contracts recently placed include the material for the Wabash Depot in this city, about 4000

tons. The Wabash Bridge will take about 10,000 tons and the Jones & Laughlin Bridges almost the same amount. There is a great deal of other bridge work in sight, and building construction will be very active this year unless the present strike should be prolonged. There is a scarcity of Angles, and premiums are being paid for prompt shipment. For large lots we quote: Beams and Channels up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Ferromanganese.—We continue to quote English Ferro at \$50 for large lots and \$52.50 for carloads and smaller lots. German Ferro is slightly lower in price.

Sheets.—The Sheet market is showing improvement, both in demand and prices, Galvanized Sheets being firmer than for some time. Prices on Black Sheets are now being generally held at 2.65c. for No. 27 and 2.75c. for No. 28; Galvanized is about 75, 10 and 2½ off. We quote: Nos. 22 and 24 Black Sheets, box annealed, one pass through cold rolls, at 2.45c.; No. 26, 2.55c.; No. 27, 2.65c., and No. 28, 2.75c. These prices are for carloads and larger lots, buyers charging the usual advances on small lots from store. On Galvanized Sheets we quote Nos. 26, 27 and 28 at 75, 10 and 2½ off for carloads and larger lots. In net prices these are equal to about 3.25c. for No. 26, 3.42c. for No. 27 and 3.70c. for No. 28. These prices apply only on carload and larger lots and are f.o.b. mill. On less than carloads jobbers charge the usual advances.

Plates.—The mills are still congested with orders for Plates, and are turning away tonnage every day on which they cannot make deliveries. The leading Plate mills are sold up for six months or longer, and prompt Plates readily bring from 1.75c. up to 1.90c., Pittsburgh. Official prices, at which most of the tonnage is sold, are as follows: Tank Plate, $\frac{1}{4}$ -inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in prices to 3c. Plates more than 100 inches wide, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Iron and Steel Bars.—Tonnage in both Iron and Steel Bars is very heavy, and a leading maker advanced prices of Iron Bars \$1 a ton last week, and now quotes 1.85c., Youngstown, equal to 1.89¾c., Pittsburgh, for carload lots. It is intimated there may be a further advance in price of Iron Bars if present heavy demand holds up. Tonnage in Steel Bars is large and contracts are being freely placed, consumers feeling sure that there will be no decline in prices. We quote Iron Bars at 1.89¾c., Pittsburgh, in carload lots and 1.95c. in small lots, half extras, as per National card. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra regardless of length.

Tin Plate.—The recent advance of 20c. a box in price of Tin Plate made by the American Tin Plate Company has stimulated demand considerably, consumers buying more freely than for some time, in the belief that prices may still further advance. If the fruit crop this year is large consumption of Tin Plate will be the heaviest ever known. We quote at \$3.80, Pittsburgh, for Common Ternes, with the usual advances for the higher grades.

Rods.—The market on Rods is very firm and supply is limited, being practically controlled by the leading interest. We quote Bessemer Rods at \$36.50 to \$37, Pittsburgh.

Spelter.—The market on Spelter is firm, and Prime Western is held at 5.05c. to 5.08½c., Pittsburgh.

Iron and Steel Skelp.—There have been very heavy sales of Skelp in the past two weeks, probably 30,000 tons having been sold. These sales have caused a sharp advance in prices, and we quote Grooved Iron and Steel Skelp at 2c. to 2.05c., and Sheared Iron Skelp at 2.10c. to 2.15c., Pittsburgh, or 2 per cent. off for cash in 30 days.

Merchant Pipe.—Very heavy contracts for Pipe have been placed recently, and the mills are so well filled up that they are now asking higher prices, the outside mills quoting about 1 per cent. higher than formerly. If present heavy demand continues, together with high prices for Skelp, a higher market on Pipe is practically certain. Discounts to consumers in carload lots, and which are firmly held, are as follows:

	Merchant Pipe Full Full weight							
	Merchant Pipe.	Steel.	Wrought Blk.	Iron.	Steel Pipe.	Iron. Blk.	Galv. Blk.	Galv. Galv.
$\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$	48	58	65	55	67	57	64	54
$\frac{1}{2}$	70	60	67	57	69	59	66	56
$\frac{3}{4}$ to 6.....	75	65	72	62	74	64	71	61
7 to 12.....	73	63	70	60	72	62	69	59

It should be noted, however, that the outside Pipe mills are quoting from $\frac{1}{2}$ to 1 per cent. higher than the above prices.

Boiler Tubes.—Tonnage in Boiler Tubes is exceedingly heavy, and the mills are sold up for the next two or three months. Discounts for carloads, f.o.b. Pittsburgh are as follows:

BOILER TUBES.		Per cent.
Steel.		
1 to $1\frac{1}{2}$ inches.....	45	
$2\frac{1}{2}$ to 5 inches.....	62 $\frac{1}{2}$	
$1\frac{1}{2}$ to $2\frac{1}{2}$ and 6 to 13 inches.....	52 $\frac{1}{2}$	
Iron.		
1 to $1\frac{1}{2}$ inches.....	36 $\frac{1}{2}$	
$2\frac{1}{2}$ to 5 inches.....	45 $\frac{1}{2}$	
$1\frac{1}{2}$ to $2\frac{1}{2}$ and 6 to 13 inches.....	35 $\frac{1}{2}$	
CASING.	S. and S.	
2 to 3 inches.....	58	
$3\frac{1}{2}$ to 4 inches.....	60	
$4\frac{1}{4}$ to $12\frac{1}{2}$ inches.....	63	

Iron and Steel Scrap.—Buying of Scrap at the present time is confined mostly among dealers, as the large consumers are pretty well covered ahead. The market in general is firm and some lines of Scrap, such as Heavy Melting Stock, are scarce. It is believed that the supply of this material will soon increase, for as soon as the weather settles the railroads will start to put down new Rails and will likely be offering the Rails they take up in the open market. Consumption of Scrap is very heavy and there will probably be a good demand right through the summer months. We quote: Heavy Melting Stock, \$21 to \$21.50, gross tons; No. 1 Wrought Scrap, \$21, net tons; Old Car Wheels, \$24 to \$24.50, gross tons; No. 1 Pipe and Tank Iron, \$18 to \$18.50, net tons; Cast Iron Borings, \$11.25 to \$11.50, gross tons; No. 1 Cast Scrap, \$20 to \$20.50, gross tons; Iron Axles, \$30 to \$30.50, gross tons; Steel Axles, \$26 to \$26.50, gross tons; Iron Arch Bars, \$28 to \$28.50, gross tons. We note a sale of 1000 tons of Heavy Melting Stock at \$21 in gross tons, f.o.b. Pittsburgh.

Connellsville Coke.—The open weather of the past week was made some improvement in the supply of Coke and the railroads are making determined efforts to increase shipments. However, deliveries of Coke are not showing much, if any, improvement, the situation being about as bad as at any time since the congestion started. The railroads will spend an enormous amount of money in the Pittsburgh district in the next year in motive power, more tracks and in other ways, but there will undoubtedly be more or less trouble in getting deliveries of Coke until well into the summer. The H. C. Frick Coke Company will spend in the next year nearly \$500,000 on repairs and new ovens, which will increase the output of Coke of this concern about 300,000 tons per year. Last week the Upper and Lower Connellsburg regions produced about 292,000 tons of Coke. Blast Furnace Coke for prompt shipment brings \$5 to \$5.50, and 72-hour Foundry \$6 to \$6.50 per ton at oven. It is said that \$3.50 and up to \$4 is being offered for strictly Connellsburg Furnace Coke for shipment over last six months.

Birmingham.

BIRMINGHAM, ALA., March 9, 1903.

The improving condition of the market chronicled last week was maintained this week and the tone was decidedly better. Confidence in the maintenance of values is solid and there is a strong feeling in some quarters that they will be advanced with the advent of the demand which conditions signal as being in sight. Every interest reports a better inquiry than prevailed the preceding week and the best that the market has shown for a considerable period. Some of them were interests that have been protesting against prices and who have held aloof from purchases. But there were no large sales. In fact, no sales above 500 tons of any one grade in any one lot were reported by any firm. But the number of orders from buyers of medium and small size lots was materially increased. Practically there was no change in prices. The average was about what has prevailed of late and there was no feature developed of interest save that of an apparent increase in confidence in the market. Besides the increased inquiry the week developed there was the added factor of small production for February, which, for this district, is estimated at at least 20,000 tons under the average monthly output. A few furnaces have had to succumb to the inconvenience of a temporary shutdown because material could not be assembled in time to keep them going, while others have barely been able to keep in blast. Maximum output has been out of the question and we have been running close to minimum capacity. The demand the past week was mainly for the foundry grades and principally for prompt and nearby deliveries. Some little business was concluded for the last half the year, but in magnitude it was not sufficient to excite any comment. Some No. 2 Foundry sold at \$18.50, and some at \$18.75, and some at \$19, and there were sporadic sales above these prices, especially when quick shipment was demanded. There was one sale reported at \$20, which is mentioned only to show the existence of the condition when price is secondary to prompt delivery. The sales above \$18.50 were mainly in lots from 50 to 200 and 300 tons. The inside price more nearly represents the fair quotation of that grade when

wanted in the usual quantities. No. 1 Soft sold at \$20 and down to \$19, the variation simply representing the views of the different sellers and showing the irregularity of prices. Some No. 2 Soft sold at \$19 and some went at \$19.50, but there was no single order of any significant volume. The purchases seemed to be for mixing purposes. No. 3 Foundry is quoted at \$18, with sales at that figure and some above it. There were sales of Silver Gray in small lots at \$22 and some insignificant sales of No. 4 Foundry at both \$17.50 and \$18. Some yet quote it at the price of Gray Forge, while others hold it at an advance of 50c. over that grade. Gray Forge shows no change. Some interests yet ask \$17.50 and obtain it, too, while you are liable to run on some at \$17. There were sales at both prices. There was one lot on the market at \$16.50 that hung fire. At last account it had found no resting place. In magnitude it was 200 tons or less. There were insignificant sales of Mottled Iron at \$17.50. While, as stated above, there were no large lots sold, the aggregate business of the week was a comfortable one. A material increase in concluded transactions is anticipated from this time forward.

As to the cars, the situation is not without complaint; but the majority of shippers report a gradual improvement in affairs. Complaints will not cease for a while, because business has outgrown facilities for its handling with promptitude, and there must be a readjustment of one with the other before complaints cease.

Coke still maintains its importance as a factor in the situation, and while there are low quotations given by some there have been sales at materially higher values. There was one sale in which delivery ran over several weeks at \$6, and there were sales at \$6.25. There were sales also at \$5 and \$5.25. Deliveries were an influential factor in the price obtained. By May 1 our capacity will be materially increased, and we will then probably be independent of outside sources for that material. The anticipation of this condition accounts for the minimum values quoted. In Coal there is no improvement in conditions. The demand is good enough, and the price is very satisfactory, but between the scarcity of cars and the inconvenience and damages resulting from excessive rains that flooded mines, both operators and miners have been up against a losing proposition. The righting of things will be slow work.

The Berry Mountain Coal Company are being organized to open coal mines that will be accessible on the completion of the Seaboard Air Line Railroad. Their location is in the Leeds district, east of us, and the character of the Coal is known to be very good. The company will be capitalized at \$200,000, and the greater part of it will be home capital.

Down at Virginia where the Shulers are opening up Coal mines the production averages about 300 tons per day, the most of which they utilize in their plants here and at Gadsden. This output will be increased at their pleasure. Of the battery of 250 Coke ovens they are erecting there, the brick work is completed on 75 of them. There have been some rumors afloat concerning the intentions of the Southern Car & Foundry Company as to Anniston and this place, involving a restriction of operations there. From primal sources your correspondent learns that there is no foundation for them whatever. What will be done here has not yet been determined, and if Anniston was to be a subsidiary point, the improvements being made there would not be undertaken.

A large Iron industry is under contemplation, to be located either at Bessemer or Ensley. The promoters are local people, and so far they are making fine progress. As at present contemplated, it will be a large rolling mill. But as it is now, it can boast only an embryonic stage.

Owing to the ill health of George B. Davis, the general manager of the Electric Railway, Light & Power Company, his resignation has been accepted and he has been succeeded by D. A. Belden, who has been the general manager of the Atlanta system. The change will be immediate.

The sanitary bonds, amounting to \$300,000, have finally been placed and delivery will be made this week, which insures the early commencement of work on our great sanitary sewer and a good long step in the foundation of our Greater Birmingham.

There is great activity in railroad circles. During the week we have had visits from several of the superior officers of lines largely interested in the district and there has resulted a quickening conclusion as to action concerning extensions, spurs, &c., that have been under consideration. There can be very little doubt now concerning the intentions of the I. C. Railroad to obtain an entrance here. They are working quietly and persistently to that end.

Mention was omitted above of the fact that the Steel mill is getting into better and better shape. A part of the heavy machinery that contemplated improvements required has arrived and is being installed and all of it will soon be in place. The demand for Steel is beyond their ability to supply. They have commenced again the rolling of Rails and will probably do so continuously from now on. Billets, Slabs, &c., are on the basis of \$30. The improvements, of which mention has heretofore been made, are all progressing and nearly 75 per cent. of office room in the new sky scraper has been engaged, which shows the onward progress we are making toward a maturer growth.

OBITUARY.

CHARLES S. SNEAD, one of the foremost citizens of Louisville, Ky., and a pioneer manufacturer of architectural iron work, died recently at his home in Louisville, at the age of 83 years. He was born in Lexington, Ky., but early went to Louisville, where he engaged in the architectural iron business, founding the Snead Iron Works. The plant grew to be one of the largest of its kind in the country. In 1898 it was burned down and Mr. Snead retired from business. His son, William Snead, built the Snead & Co. Iron Works, in Jersey City, N. J.

JOHN P. LAFLIN, for a number of years president of the East Chicago Foundry Company of Chicago, Ill., died on February 24, of heart disease, at Miami, Fla., aged 45 years.

JOHN MCFARLANE, senior member of the firm of McFarlane & Hignell, proprietors of the Fishkill Landing Boiler Works, died suddenly from heart disease on March 5, at his home in Fishkill Landing, N. Y. For a number of years he was foreman of the Delamater Iron Works, New York.

ABRAM S. TOWNSEND, who died suddenly from heart disease on March 7, while visiting at Mount Vernon, N. Y., was for 35 years superintendent of the Atlantic White Lead Company of Brooklyn, and after that concern were absorbed by the National Lead Company, was manager for the last named corporation. He retired from business a few years ago and removed to Belmar, N. J. Mr. Townsend was 68 years old.

GEN. WILLIAM BUEL FRANKLIN of Hartford, Conn., who commanded an army corps in the Civil War, and a prominent citizen of Hartford, Conn., died on March 8 in that city, aged 80 years. He was born in Franklin, Pa., and was graduated from West Point, where he was a classmate of Gen. U. S. Grant, in 1843. General Franklin resigned from the army in 1866 and became vice-president and general manager of the Colt Patent Firearms Mfg. Company of Hartford, an office which he held until 1888. Subsequently he was Superintendent of Construction of the Connecticut State Capitol.

ROBERT O. FULLER of Cambridge, Mass., died March 9, at the age of 73 years. He was the head of the metal house of Fuller, Dana & Fitz of Boston, until 1892, when he retired from business.

JAMES REILLY, president of the James Reilly Sons Company, died on March 8, at his home in New York City, aged 64 years. He had been for 35 years in the marine construction business and was a member of the Engineers' Club, the General Society of Mechanics and Tradesmen and other organizations.

GEORGE L. RAYMOND, one of the sales agents of the Gautier department of the Cambria Steel Company, died at Cincinnati on February 28.

OTIS T. STANTIAL, who for 11 years was superintendent of the Illinois Malleable Iron Company, Chicago, died at his home in Chicago on March 6, of pneumonia. Mr. Stantial was in the fortieth year of his age. The fatal illness was contracted about two weeks ago, but previously he had been suffering from an attack of pleurisy. Mr. Stantial was a graduate of the Boston Institute of Technology, and prior to his connection with the Illinois Malleable Iron Company served as head chemist with the Deering Harvester Company and the Crane Company of Chicago.

DANIEL O'NEIL, for many years foreman of the foundry department of the Union Iron Works, San Francisco, Cal., died recently, aged 70 years.

During their second annual convention, to be held at New Orleans, April 8, 9 and 10, the Southern Supply and Machinery Dealers' Association will have their headquarters at the St. Charles Hotel. C. B. Carter of Knoxville, Tenn., the secretary-treasurer of the association, is now arranging for special railroad and hotel rates for the members and guests.

PERSONAL.

Among the recent arrivals from Europe are Maurice Bell of Redcar, a grandson of Sir Lowthian Bell, and G. T. Jones, of the Clarence Works, Middlesbrough.

JAMES ROSS of Montreal, president of the Dominion Iron & Steel Company, has gone to the Mediterranean. He is expected back in May.

CHARLES M. SCHWAB, president of the United States Steel Corporation, has sold his Pittsburgh residence, known as "Highmont," to D. M. Clemson, president of the Pittsburgh Steamship Company, an identified interest of the United States Steel Corporation. Mr. Schwab bought this place about three years ago from the Vandergrift estate, but occupied it only a short time. The price is given as \$300,000.

R. T. TURNER, recently connected with the Pittsburgh sales offices of the American Sheet Steel Company, has been transferred to the Detroit office of that concern.

The recent resignation of H. C. Frick, a director of the Pittsburgh Coal Company, was to allow him to give more time in an advisory and executive capacity to the United States Steel Corporation.

W. MILTON BROWN of Johnstown, Pa., has gone to Wolverhampton, England, to look after the interests of the Lorain Steel Company at that place, and J. Wesley Gallagher of Johnstown has sailed for London, to enter the London offices of the company.

D. C. FENNER, lately in charge of the crucible steel department of the Bethlehem Steel Company, has been engaged to take entire charge of a new crucible steel plant now in the course of erection at Sheffield, England.

COL. JOHN J. CARTER, one of the largest stockholders and an official of the Titusville Iron Company, has sold his holdings to J. L. McKinney and has retired from the company. Mr. McKinney was president of the company and a large stockholder before he purchased the Carter holdings. Colonel Carter's place in the directorship of the company has been filled by the election of Barnard Abel, the superintendent of the company.

RALPH McCARTY, for the past three years general manager of the Bignall & Keeler Mfg. Company, of Edwardsville, Ill., will sever his connection with this firm about April 1 and assume the duties of general manager of the Stoever Mfg. & Foundry Company at Myerstown, Pa.

Presentation to and by John Stevenson, Jr.

JOHN STEVENSON, JR., vice-president of the Sharon Steel Company, Sharon, Pa., left on February 27 for a European tour. Just before his departure he was presented with a fine bronze, modeled after Millet's painting, "The Sower." The presentation speech was made by J. P. Whitla, general sales agent and secretary of the company.

After Mr. Stevenson's train had been gone several hours an official of the company distributed envelopes to the clerks and men immediately associated with him in the management. These envelopes contained a brief letter, together with cash ranging in amount from \$10 to \$1000. The heads of departments received \$250 each. The letter which each man received read as follows:

"I herewith inclose you a check as a little remembrance from me of how much I have appreciated your labors in helping to build and run these mills. I leave them with much regret. I hope you will assist the new management which takes my place in every possible way and help to make the Sharon Steel Company a grand success."

Ore Freights May be Advanced.—It is said that within the next few weeks a meeting of freight traffic officials of the Pittsburgh and Valley districts will be held in Cleveland, and that there may be an advance in freight rates on iron ore for this year. The rates last season were \$1.15, between lower lake ports and Pittsburgh, and there is talk of making the new rate \$1.25, with proportionate advances for intermediate points.

New York.

NEW YORK, March 11, 1903.

Pig Iron.—In this particular district the buying movement is limited. It is noted, however, that in New England there has been some interest in deliveries for the second half and a fair amount of business has been done both in foreign and domestic Foundry Irons. The foreign markets, notably those of Germany, are firmer, and it is reported that a large part of the German Foundry Iron available two months since has recently been taken by German melters. Middlesbrough Iron cannot now be bought for less than \$18.50, cargo lots. We quote for prompt to early delivery Northern Iron, \$23.50 to \$24.50; No. 2 Foundry, \$22 to \$22.25; No. 2 Plain, \$21.25 to \$21.50; Tennessee and Alabama brands, in New York and vicinity, No. 1 Foundry, \$23.50 to \$24.50; No. 2 Foundry, \$22.50 to \$22.75; No. 3 Foundry, \$21.50 to \$22.

Steel Rails.—The market is quiet. One of the Coal roads has placed an order for 20,000 tons and a New England road is about to contract for a round lot. There are some large inquiries in the market for Foreign Rails, but no business has been placed as yet. We continue to quote \$28 for Standard Sections at mill.

Cast Iron Pipe.—The contracts referred to last week as about to be let at various Eastern points were duly placed, the bids developing the interesting fact that manufacturers are much less anxious for tonnage than they have been. Quite a number of foundrymen advanced their quotations considerably above prices previously named, thus showing indifference as to whether they secured the business. This is due to the rapid filling up of the Eastern foundries with work which will carry them along well into summer. While no large tonnages are now in sight a continued influx of small orders is reported, mainly for sizes from 16-inch down. The improved condition of the market is shown by further stiffening in prices, and makers are now quoting \$35 gross ton for 6 to 12 inch at tidewater.

Finished Iron and Steel.—The American Bridge Company have booked orders aggregating a good tonnage. The most important of these are highway work for New York City at Croton, N. Y., about 2700 tons; bridges for the Southern Pacific Company, 2600 tons; an office building in Detroit, 2000 tons; a power house at Pittsburgh, 1500 tons; bridge work for the Pennsylvania lines west, 1250 tons, and for the Boston & Maine Railroad, 500 tons. Inquiries are in hand for a great deal more work of a varied character. The company are at present suffering from a strike of their workmen in a number of cities, but their employees at Chicago, Boston and New Haven have refused to go out in compliance with the strike order issued. It is believed that any questions at issue can easily be settled and a protracted strike is not expected. The Plate trade in this locality is inclined to quietness, although some fair sized orders have been placed during the week. The Eastern mills are now more disposed to resist the efforts of Western competitors to secure business in this territory. While quotations have not been officially reduced, it is intimated that concessions might be made when necessary. The strike among the boiler makers and workmen in shipyards in this vicinity has rapidly spread and it is stated that practically every shipyard is now idle. It is hoped that these troubles will soon be adjusted, as if continued for any length of time they will considerably reduce the local consumption of Finished Steel. The Bar trade is reported fairly active. We quote at tidewater as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.25c. Sheared Steel Plates are 2.10c. for Tank, 2.20c. for Flange, 2.35c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.75c. to 1.90c.; Foreign Beams, 1.72½c. in large lots.

Old Material.—The demand for all classes of Old Material is growing. Steel works, rolling mills and foundries are all buying, and in some cases quite large purchases have been made for extended deliveries. Prices are therefore a trifle stronger. We quote, f.o.b. cars, vicinity of New York, per gross tons:

Old Iron Rails.....	\$24.25 to \$24.50
Old Steel Rails, long lengths.....	21.00 to 21.50
Old Steel Rails, short pieces.....	19.00 to 19.25
Relaying Rails, heavy sections.....	29.00 to 30.00
Relaying Rails, lighter sections.....	31.50 to 32.00
Old Car Wheels.....	23.50 to 24.00
Old Iron Axles.....	30.00 to 31.00
Old Steel Car Axles.....	25.50 to 26.50
Heavy Melting Steel Scrap.....	19.00 to 19.25
No. 1 Railroad Wrought Scrap Iron.....	23.00 to 23.25
Iron Track Scrap.....	20.00 to 20.25
Wrought Pipe.....	16.00 to 16.50
Ordinary Light Iron.....	11.50 to 12.00
No. 1 Machinery Cast Scrap.....	19.00 to 20.00
Stove Plate.....	14.50 to 15.50
Wrought Turnings, delivered at mill.....	17.25 to 17.75
Cast Borings, delivered at mill.....	11.00 to 11.50

Metal Market.

NEW YORK, March 11, 1903.

Pig Tin.—The speculation which has characterized the markets here and in London assumed wild proportions to-day. Prior to this the market had been declining steadily since our last writing, and while last Wednesday the lowest quotation for spot was 30.62½c., yesterday the market had reached 29.82½c. The advance of to-day was begun in London, where an advance of £1 was scored at the opening and £3 had been added to this price before the close. The cables announcing these advances gave no cause whatever, and consequently it is assumed in the trade that the manipulators simply took matters in their own hands, and through "wash sales" increased the fictitious values. The London market had also been declining throughout the week until to-day; the market yesterday having touched £135 12s. 6d. The closing quotation for spot to-day was £139 15s., and futures closed at £138 15s. In this market quotations to-day were as follows: Spot, 30.55c. to 30.75c.; March, 30.55c. to 30.90c.; April, 30.50c. to 31c.; May, 30.40c. to 31c. Business was slow throughout the entire week, so far as consuming interests were concerned. Arrivals thus far this month amount to 1422 tons, and the afloats are figured at 3670 tons.

Copper.—The week under review has but emphasized conditions which prevailed throughout the last few weeks. Through sheer force the speculative element have driven prices upward, and consumers have shown no tendency whatever to engage. The upward movement of prices has been slow and steady, moving a little each day, until to-day the quotations nominally stand 14.50c. to 15c. for Lake, Electrolytic and Casting, while Standard is now quoted 14c. on the New York Metal Exchange. The market is now in the most unsettled condition which has been witnessed for some time. Business is practically at a standstill. Every one connected with the selling end of the business seems to have given way entirely to the fever for higher prices, and consequently all quotations are considerably beyond what consumers feel disposed to pay. The interests who were instrumental in the discontinuance of the Copper production statistics are now the most active in booming the market. This fact is commented upon as significant. It is generally believed in the trade that the effect desired by the present ring-leaders is the advancement of Copper shares. The smaller interests have, however, fallen in line, and are so excited over the success that they are now losing sight of the chief object and are talking as though they really expected to see a permanently higher Copper market. They are talking of big business when inquiries are as scarce as the proverbial hens' teeth, and are commenting upon the heavy exports in spite of the fact that so far this month only 3648 tons have been sent abroad, and the total exports this year are fully 40 per cent. below what they were last year. The closing prices in London to-day were £64 5s. for spot, £64 12s. 6d. for futures and £69 10s. for Best Selected.

Pig Lead.—An advance of .25c. was made yesterday by the American Smelting & Refining Company. The price of spot was increased from 4.12½c. to 4.37½c. Futures, 15 days' delivery, were advanced from 4.10c. to 4.35c. The advancing London market was given as the cause for the change. In London the cause stated for the higher quotations is speculative purchasing. Since our last writing the London market advanced just £1 to £13 12s. 6d.

Spelter.—Efforts have been made to keep this metal advancing to correspond with the increasing Copper prices. Spot advanced here this week to 5.20c. to 5.25c., and St. Louis now quotes 5c. The London market went up £1 5s. during the week.

Antimony.—There was a slight stiffening of prices. Hallett's is now quoted 6.75c. to 6.82½c.; Cookson's, 8.25c. to 8.50c., and other brands 6.50c. to 6.75c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—Is unchanged at \$47 per flask of 76½ lbs. each in lots of 50 flasks or more. London cables £8 12s. 6d.

Tin Plate.—There is no change, the price made last week still ruling. Business is fair. The price of the American Tin Plate Company is based on \$3.80 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, and \$3.99 New York delivery.

The most important ship contract awarded in this city this year was concluded on Saturday last, when John B. Roach, president of the Delaware River Iron, Shipbuilding and Engine Works, received the order to build two big passenger and freight steamships for the Ocean Steamship Company, better known as the Savannah Line. They will be each of over 5,000 tons register.

The New York Machinery Market.

NEW YORK, March 11, 1903.

We are authoritatively informed that the effort to consolidate the prominent builders of high speed engines has been abandoned for the present. Several meetings of the engine builders were held, but no agreement could be reached along the lines proposed. It was not intended to float a large company involving the sale of securities, but the scope of the project included the pooling of interests with no fresh capital. The idea was to combine the plants as far as practicable, in order to gain more economical production, and to have central selling offices located in the large cities and thus do away with a great deal of the unnecessary competition and operating expense. The securities of the new consolidated company were to be taken in payment for assets by the various engine builders, and were not to be sold in the open market. The law firm of Simpson, Thatcher, Barnum & Bartlett of 25 Broad street were endeavoring to bring the parties together. For the time being the project has been abandoned.

Further extensions are being planned by the General Electric Company. For their Lynn, Mass., plant the company contemplate building a new structure, 700 x 150 feet. It will be recalled that this company now have a series of large buildings under way at Lynn. No purchases for the equipment of these buildings have been made as yet. It is reported in the trade that another large building is to be erected at Schenectady. All of these extensions, it is said, are incident to the company's new steam turbine business. While they have no very large lists of specifications out at present, this company are probably the most active purchasers of machine tools in this market to-day. They are constantly placing small orders for machinery in connection with changes and general increases. For the equipment of the new buildings now under construction and in contemplation it is expected, however, that several good big lists will be compiled and sent out to the trade before long.

It is generally believed in the trade that the long delayed specifications of equipment for their new Harrison, N. J., plant will now be soon forthcoming from the International Steam Pump Company. Contracts are now being placed for the various buildings. Purchasing Agent Colling stated yesterday that the list had not been completed as yet, but could be expected almost any day within the next few weeks.

We have it on good authority that plans are well under way for the great new plant of the Ingersoll-Sergeant Drill Company to be built at Phillipsburg, N. J. We are advised that the plant is to include 17 buildings, some of them to be of large dimensions. It will be recalled that the original intention was to build only the foundry at present. Contracts for the construction of this building have been let and contracts for the other buildings are now being awarded. Certain portions of the equipment are also under consideration at this time, but the specifications for the requisite machinery have not been issued as yet. In a recent report of the company it was stated that \$1,500,000 was to be expended on the new plant.

The Ledgerwood Mfg. Company of 96 Liberty street, New York, whose plant is located at South Brooklyn, have purchased a large tract of land at Newark, N. J., for the purpose of removing their plant from Brooklyn. John V. Beekman, vice-president of the company, made the following statement to a representative of *The Iron Age*: "The fact is simply that we have outgrown Brooklyn. Conditions have changed very materially within the last five or six years which also make it desirable to move from Brooklyn. We are constantly hampered by walking delegates and factory inspectors, who roam through our plant and try to earn their salary by interfering with our work. New York is no place for a large manufactory, while in New Jersey the conditions are directly opposite. We have bought a site and are now negotiating with the city of Newark with a view of having certain streets closed. We are not going into this town with a rush, but may take a couple of years in transferring the works. We have not enough foundry capacity at present and are encountering a good deal of difficulty in obtaining castings. So we intend building our foundry in Newark as soon as we can get at it. None of the plans are ready as yet, although I have been thinking of this matter for some time and have an idea of about what we shall do. The foundry will be built first and the balance of the plant will be gradually transferred around it."

The attention of the machinery trade is now largely directed toward the railroad companies. Their annual specifications are now coming to the front, and a good deal of business will soon be due from this quarter. One of the most interesting matters in connection with the railroad trade is a rumor which is being passed among the well posted members of the trade to the effect that the Vanderbilt Lines are to expend considerable money in improving their entire shop system. A mechanical expert has been engaged to travel along the routes and inspect all shops. He will suggest such improvements or extensions as will tend to increase their efficiency and economy. While there are a good many modern shops along the New York Central lines, it is

also known that many of the shops operated by this road can stand a good deal of improvement in the way of new machinery. It is consequently expected that large appropriations will be made this year for new equipment, as a result of the report of the shop expert.

The New York Central Railroad are now making extensive improvements at West Albany, and the trade have expected a good machinery list for some time. This has not been issued as yet. The list of the Louisville & Nashville Railroad is expected to be a large one. This road is building a new system of shops at South Louisville, which will cost about \$2,000,000. Almost a complete equipment of new machinery will be required, as the present shops are somewhat antiquated. P. P. Huston is purchasing agent, with headquarters at Louisville, Ky.

The Boston & Albany Road are arranging for the building of large shops at Springfield, Mass. No purchases have been made as yet. D. Fairchild, with offices at New York, is purchasing agent.

The Norfolk-Hampton Roads Shipbuilding & Dry Dock Company, a new Virginia corporation, have just issued a prospectus, stating that it is intended to erect a large plant at Norfolk harbor. The site selected is Sewell's Point. It is proposed to build a \$5,000,000 plant, which is to include a shipbuilding plant, a dry dock 1000 feet long and a marine railway with a hauling capacity of 2500 to 3000 tons. The company are to be capitalized at \$10,000,000. The officers of the company are: W. P. Harrison of Cincinnati, Ohio, president; W. H. Knauss of Columbus, Ohio, vice-president and treasurer; J. T. Gamble of Columbus, Ohio, secretary. The directors also include J. Verner Ewan of Covington, Ky., and T. J. Davis of Cincinnati, Ohio.

In our issue of February 26 a note was printed stating that the Snead Architectural Iron Works had purchased a tract of land at Jersey City, N. J., for extending their plant. The similarity of names of the Snead Architectural Iron Works of Louisville, Ky., and the Snead & Co. Iron Works of Jersey City, N. J., led to this error. The article should have read: "The Snead Architectural Iron Works have purchased a large tract of land, with about 750 feet railroad frontage, adjoining their present buildings at Louisville, Ky. They will erect immediately four large buildings, to be used as office, pattern shop, foundry and fitting shop, besides the necessary number of open buildings for general use and storage. They are purchasing an entirely new outfit of machinery for all departments, including electric traveling cranes. The company will be better equipped than heretofore for the prompt and satisfactory execution of all contracts for structural and ornamental iron work required in buildings. The officers of the company are Bernard Selligman, president; J. A. Holmboe, vice-president, and Thos. S. Snead, secretary-treasurer." The Snead & Co. Iron Works of Jersey City, who, we are advised, have no connection with the Louisville Company, are also making extensions to their plant. They are extending their fitting shop and adding considerable machinery. The officers of the company are Udolpho Snead, president; Jacob F. Arnold, general manager, and E. H. Patton, secretary and treasurer.

The Springfield Drop Forging Company of Springfield, Mass., have decided to discontinue the machining and finishing of forgings, and to enlarge the drop forging department to an extent which will increase their output considerably. In view of this change it has been decided to dispose of the large line of machine tools which were formerly employed in the machining and finishing department. These tools will be sold at auction at the works on Wednesday morning, March 18. Included in the list are lathes, screw machines, drill presses, Baker Bros. boring and turning mill, Walcott shaper, grinders, P. & W. profiler, hangers, pulleys and shafting. Also small tools, consisting of gauges, threading dies, taps, reamers, counterborers, mandrels, files, vises, chucks, jigs, &c.

Vieillard & Osswald, Brooklyn, N. Y., manufacturers of presses, dies and special machinery, have removed from Jamaica avenue, where they have operated for ten years. Their new factory is at 93-97 Pearl street, with greatly increased space and equipment, the need of which is urgent at present, due to special machinery contracts, including a complete chain making outfit for the Locke Steel Chain Company, Limited, of London, England. Vieillard & Osswald report having had an exceptional trade during 1902 on their regular line of V. & O. presses, and in their new quarters they have provided for more than double their past output.

Iron and Industrial Stocks.

The increasing stringency in the money market and the aggressive operations of a strong bear party combined to depress stocks considerably during the week. Quotations on some industrials made a new low price record. Among these was American Can, common, which was forced down to 7½, although the preferred was held above its low price in December. Colorado Fuel declined from 71 to 64½; American Car & Foundry, common, from 40 to 38, and the preferred from 92½ to 90; American Locomotive, common, from 29½ to 27½; Cambria Steel from 24% to 23%; Republic Iron &

Steel, common, from 21½ to 19½; Sloss-Sheffield, common, from 69 to 65; Tennessee Coal & Iron, from 65½ to 61¼; United States Steel, common, from 38½ to 36¼, and the preferred from 87½ to 85¾. The new United States Steel 5 per cent. bonds, which sold at 91¼ on Thursday of last week, were forced down to 87½. The decline in industrials was not universal, but in a number of instances values were firmly held. This, however, was mainly in the case of stocks commonly considered inactive.

The Sloss-Sheffield Steel & Iron Company reports for January:

Profit from operation.....	\$264,828
Depreciation and charges to extraordinary repair and renewal fund.....	\$13,847
General expenses, not charged in cost sheets.....	3,280
Monthly proportion of bond interest and taxes.....	20,000
	<u>37,127</u>
Net surplus.....	<u>\$227,701</u>

The Dominion Iron & Steel Company.—The earnings of the Dominion Iron & Steel Company of Canada for the month of January show a deficit of \$37,067 after proportional interest charges and preferred stock dividend requirements. The December deficit was \$8142. The January earnings in detail are as follows:

Earnings of Dominion Coal Company.....	\$158,844
Earnings of Steel Company.....	21,020

Total.....	\$179,865
Bond interest.....	\$33,108
General interest.....	8,607
Coal lease and interest.....	141,433
Sinking fund.....	4,616
	<u>187,765</u>

Deficit.....	\$7,900
Preferred dividend Steel Company.....	29,166

Total deficit.....	<u>\$37,067</u>
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For the nine months earnings were as follows:

Earnings of Coal Company, 11 months.....	\$2,136,172
Earnings of Steel Company, nine months.....	330,906

Total.....	\$2,467,078
Bond interest.....	\$298,484
General interest.....	120,832
Coal lease, 11 months.....	1,474,766
Sinking fund, nine months.....	37,949
	<u>1,932,031</u>

Net earnings.....	\$535,047
Preferred stock dividend, nine months.....	262,500

Surplus.....	<u>\$272,547</u>
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The poor showing for January is attributed "to severe winter weather preventing operations."

The Niles-Bement-Pond Company.—The annual statement of net earnings of the Niles-Bement-Pond Company and constituent companies for the year ended December 31, 1902, has been issued. The statement, which is as follows, shows that the company have had a prosperous year:

	1902.	1901.	Increase.
Net	\$1,627,965	\$1,468,570	\$159,395
Dividends	653,500	603,508	49,992
Balance.....	\$974,465	\$865,062	\$109,403
Depreciation	200,000	196,605	3,395
Surplus.....	\$774,465	\$668,457	\$106,008
Enhanced value of investments.*	1,382,219		1,382,219
Totals.....	\$2,156,684	\$668,457	\$1,488,227
Previous surplus.....	2,256,803	1,617,376	639,517
Total surplus.....	<u>\$4,413,577</u>	<u>\$2,285,833</u>	<u>\$2,127,744</u>

* This represents the difference between the cost of certain stock in other companies and the present value of the same securities as approved by a committee appointed for that purpose.

The Railway Steel Spring Company.—The statement of the Railway Steel Spring Company for the first ten months of the company's business, made public after the annual meeting of the stockholders in Jersey City, March 5, reflects the prosperity of the railroads of the country, as well as the various concerns that produce railroad equipment. All the plants of the company are in active operation, and are making excellent returns. Some very large contracts have been placed with the company by railroads since January 1, and the unfilled business on the books guarantees a prolonged period of activity. The statement of the company follows:

	Assets.
Plants	\$24,156,397
Merchandise on hand.....	1,282,824
Stocks and bonds.....	200,085
Accounts receivable.....	2,156,095
Other items.....	18,625
Cash	435,188
Total assets.....	<u>\$28,249,214</u>
	Liabilities.
Capital stock: Preferred shares.....	\$13,500,000
Capital stock: Common shares.....	13,500,000
Accounts payable, &c.....	256,846
Reserved for dividend, taxes, &c.....	88,580
Surplus	903,788
Total Liabilities.....	<u>\$28,249,214</u>

It is stated that at the present rate of earnings the Tennessee Coal & Iron Company will show 25 per cent. on their common stock this year. This increase is the result of higher prices for iron and increased production.

In referring to an issue of bonds by Deere & Co. in *The Iron Age* of February 26, the statement was made that they were being offered by Peabody, Houghteling & Co. and the First National Bank of Chicago at 105 and interest. This was incorrect, the price being par and interest. The price of 105 is that at which the bonds are redeemable. The bonds mature in blocks of \$125,000 annually. Charles H. Deere of Moline, Ill., president of Deere & Co., in a letter to the bankers, states that the issue of \$1,500,000 5 per cent. serial gold debenture bonds is made for the purpose of consolidating the indebtedness of the company into one form. When issued they will constitute the entire indebtedness of the corporation, excepting the usual current accounts not yet matured. After completing this transaction the condition of the company will be approximately as follows as of January 1, 1903:

Assets.	
Land, buildings, machinery and personal property.....	\$1,958,443.95
Raw material and manufactured product.....	1,730,587.87
Cash, accounts and bills receivable.....	2,260,297.32
Other assets at branch houses.....	2,168,996.42
Total.....	<u>\$8,118,325.56</u>

Liabilities.	
Capital stock.....	\$6,000,000.00
Bonded indebtedness.....	1,500,000.00
Current accounts payable (not yet due).....	392,333.50
Profit and loss account.....	225,992.06
Total.....	<u>\$8,118,325.56</u>

The statement is accompanied by a report of the Audit Company of New York, and by W. R. Sterling of Peabody, Houghteling & Co., for many years connected with the Illinois Steel Company, on the physical condition of the properties.

The low prices at which the new bonds of the United States Steel Corporation have been selling has been a surprise to the iron trade. The unexpected feature in connection with these bonds, which was not mentioned previous to the official announcement, is the default clause as now arranged, which, however, is subject to any changes in wording agreed upon between the United States Steel Corporation and J. P. Morgan & Co. before the bonds are issued: "In case default shall be made in the payment of the principal or interest of any of the bonds which shall have been delivered to, and which shall be held by the trustee hereunder, or of any other bonds secured by the same mortgage or deed of trust as such bonds held by the trustee, then in any such case, if the trustee shall hold more than 90 per cent. in amount of the entire issue of such bonds in default, it shall, upon a written request of the steel company, and in other cases, upon such written request, it may, in its discretion cause proper proceedings to be instituted and prosecuted in some court of competent jurisdiction to foreclose or enforce the mortgage or trust, or charge, by which such bonds or obligations in default are secured. In case the steel company shall be in default in the payment of the principal of any of the bonds thereby secured, or in case the steel company shall be in default in the payment of interest on any of such bonds, and such default shall have continued for a period of two years, then the trustee in its discretion, may institute such proceedings without such written request."

The Columbus Chain Company have increased their capital stock from \$200,000 to \$400,000.

The Columbus Iron & Steel Company of Columbus, Ohio, of which J. G. Battelle is president, have increased their capital stock from \$500,000 to \$750,000, the new stock being taken by the stockholders. The company, who have two blast furnaces at Columbus, coke ovens and coal mines at Marting, Fayette County, W. Va., have purchased for \$150,000 the Raven Coal & Coke Company, at Stone, W. Va., and will build 100 ovens.

Dividends.—National Enameling & Stamping Company have declared the regular quarterly dividend of 1½ per cent. on the preferred and 1 per cent. on the common stock, payable April 1.

The Union Switch & Signal Company have declared a dividend of 2½ per cent. on the preferred and 1½ per cent. on the common stock for the quarter ending April 1.

Crucible Steel Company of America have declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable March 30.

Otis Elevator Company have declared the first dividend of 2 per cent. on the common stock, and the regular quarterly dividend of 1½ per cent. on the preferred stock, both payable April 15.

Sloss Sheffield Steel & Iron Company have declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable April 1. Books close March 21; reopen April 2.

New Haven Iron & Steel Company have declared a dividend of 25 cents per share, payable March 25.

Chicago Machinery Market.

CHICAGO, March 7, 1903.

Our usual monthly returns from the most important manufacturers of machinery in the Northwest, as well as reports from agents distributing machine tools and supplies, indicate not only a continuation of the activity which has been the most prominent feature of previous returns, but show in some instances that sales have been the largest in the history of individual companies; and notwithstanding the wonderful expansion during the past year, it becomes necessary to further increase capacities through the construction of additional buildings and by the installation of new, larger and more efficient tools. A prominent feature is the urgency of the demand for quick shipment and the increased buying of small units from stock. In the machinery section, as in other departments of the iron and steel industry, not a little inconvenience is being experienced through the inability of transportation companies to properly care for the immense traffic offered. The detailed features of trade in the various divisions of the machinery world follow:

Machine Tools.

A prominent feature of the trade in machine tools is that many or most of the orders are what are called "pick ups" coming from industries already well equipped, which reflects the general extension of well established businesses. One agent notes that sales during the month of February exceed sales made during any other month in the history of their trade. Other distributors verify this statement, in that no large contracts have been offered, but that the number of small orders has more than compensated for such business, the month of February being equal to, if not larger, than that of February a year ago. One point of interest is that purchases are from stock for quick delivery. Manufacturers as well as agents note the continued activity in this line, some reporting their business greater than ever before, and notwithstanding their increased capacity, they are as far behind as ever in making shipments, and contemplate further building of moment during the coming summer. Others report a larger number of orders on their books than ever before in their history, their trade coming largely from boiler shops, agricultural iron works and railroad companies.

Transmission Machinery.

Reports from manufacturers of power transmission machinery for the month of February have been extremely favorable. The largest producers note that while they have increased their output through greater capacity, orders for machinery have increased in as great if not greater ratio, putting manufacturers as far behind to-day as for many months. A portion of this inability to catch up with orders is due to the difficulty in obtaining raw material and castings incidental to the congested condition of the railroads and of foundries and metal working shops. To be relieved from the present pressure additional new buildings and installation of even more tools seems necessary. The demand for transmission machinery still continues largely from the steel and iron industries, including machine shops; but railroads, electric light and street railway companies are also making increased demands. A glance at the list of the partial sales herewith given shows how widely distributed the demand is. Inquiries from abroad are increasing, but with a heavy volume of trade from domestic sources there is little disposition to solicit export orders.

Special Machinery.

The demand for special machinery, and more particularly for mining outfits, has been very brisk since the opening of the year, some large manufacturers noting a great increase in the volume of orders secured over those obtained for the same period last year. Not a few manufacturers are still preparing to further increase their capacity by the erection of new buildings and the installation of larger and more efficient tools. The demand for molding machines and other foundry equipment has been a surprise to the trade, especially the demand for immediate shipment. Nearly all the larger manufacturers are running both night and day. The demand for machinery for wood working, especially in pattern shops, reflects the great activity of the machinery and metal working trades. One or two manufacturers of mill and elevator machinery note a little falling off in new business during February. Makers of refrigerating machinery note a very satisfactory trade, a large number of installations being made in the Eastern territory. Manufacturers of wind mills seem to be an important exception to other producers of machinery, in that conditions to-day are quite different from those prevailing a year ago. Last February the demand was active, the trade having been disappointed in getting supplies due to the active demand resulting from the excessive dry weather. To-day these conditions are reversed. The last part of the 1902 season was exceedingly wet, and with the trade well stocked there is no disposition now to anticipate orders. Inquiries from abroad for special machinery have been more frequent, but American manufacturers, as a rule being so pressed with domestic

contracts, are giving but scant attention to the European trade.

Engines, Boilers and Pumps.

In the engine, boiler and pump department the continued working at high pressure is noted. Most manufacturers are running night and day shifts, and notwithstanding they are running more men than ever before, they are just as far behind in the filling of orders as ever. It is notable that builders of engines, however, are taking considerable foreign business in marked contrast to other machinery manufacturers. The demand for gas and gasoline engines is particularly notable, and orders are well distributed, including portable, pumping and hoisting types, sawing outfits, as well as engines and attachments for boats and the ordinary standard stationary types. There is scarcely a manufacturer but is running his plant to full capacity. Manufacturers of steam engines and locomotives are booked for months and months ahead, and not a few of them are refusing to take additional new business. Even smaller manufacturers are booked from three to four months ahead, notwithstanding that everything is being done to improve facilities for getting out work. The demand also is brisk for boilers and pumps, some pump manufacturers noting that their volume of business in January was 10 per cent. greater than the first month of last year, and that in February there was an increase of fully 20 per cent. over February, 1902. Further increase in the capacity will be necessary.

Tools and Supplies.

Manufacturers of pneumatic tools are conspicuous for their optimism and for the almost phenomenal increase in the volume of business, one of the largest producers noting that orders received during February this year are fully 50 per cent. greater than those booked during the corresponding month a year ago. In more or less degree this has been the experience of other manufacturers of small tools, a great many stock orders having been placed during the month, indicating that the opinion prevails that present conditions of business will continue for some months at least. The call for small and medium sized tools has been unusual; not only from the Central West, but from the Pacific Coast, the increase being remarkable. The demand for foundry supplies was scarcely ever greater. Orders are coming in from all parts of the United States, and even foreign business is improving, although somewhat neglected in the face of the activity of the domestic markets.

Machine Tools.

McDowell, Stocker & Co., Chicago, state their trade during the past month has been very satisfactory, the demand for machine tools keeping up very well indeed. Sales for February will exceed any month's business that they have had since starting in business. Most of this trade is on "pick up" orders from concerns already equipped, which shows a general extending of their business.

The Kempsmith Mfg. Company, Milwaukee, Wis., say that the demand for millers has shown an increase during the closing week of February. Both in January and February buyers seem to have entered the market as the months grew old. Inquiries are very good, and they see no indication that the coming year will not prove as prosperous as last year.

Hill, Clarke & Co., Chicago, Ill., report that the trade for February has been very large, and they think fully equal to that of February a year ago. Small orders have been a great feature, there having been very few large contracts placed, although several large purchases are now in consideration. The purchases seem to be largely from stock for quick delivery to round up the different plants to an even basis of production.

The Aurora Tool Works, Aurora, Ind., state that their February business has exceeded their expectations. Most of their trade has been domestic. There have been very few foreign orders, but a number of inquiries.

Novelty Iron Works, Dubuque, Iowa, say the demand for their lines of goods is very satisfactory, but orders are not in excess of those received at this time last year. They do not contemplate any additional improvements to their plant, as they expect their present equipment will take care of future orders. Foreign trade is improving, and although domestic business requires most of their attention, they are cultivating foreign markets. They do not expect the present home demand to continue very far into the future.

The New Doty Mfg. Company, Janesville, Wis., report that business is better than ever before. They have increased their capacity in the past year, but are still as much behind as ever, and contemplate more building the coming summer. They have more orders on their books than ever before in the history of their business, and orders continue to come very freely. Inquiries would indicate that the volume of business would continue for months to come. Their business has come largely from boiler shops, architectural iron works and railroad shops. They loaded February 23 two cars of machinery for shipment to the Government Navy Yard at Boston. They do not know much about the foreign trade, their present business being almost all domestic. They have never cultivated foreign orders very much, although some are sent them through exporters.

Williams, White & Co., Moline, Ill., state that orders are coming in as fast as ever, and they have taken a number of good sized contracts. They have hardly yet been able to take advantage of their new building and increased facilities—that is, they are not yet fully settled in their new buildings. They do not expect to make any further extensive improvements this year. So far as foreign trade goes, they get a few orders, but they are not pushing foreign trade very hard.

George Whiting Company, Chicago, Ill., report business very satisfactory during the past month, and while they did not close for as many machines as they contemplated, they secured a number of orders. In spite of the additional equipment that they have installed they find that they are unable to keep up with their orders, and from what they can judge by the present believe it will be necessary for them to make still another addition to their equipment in the near future. Being practically a new firm, their orders are necessarily from their own immediate locality, as a rule, but they report that during the last month they have received a large number of inquiries from the different parts of the United States. The business that they have received, as a rule, has been derived from concerns engaged in structural iron work. Judging from reports they believe there is still a large amount of business that is yet to be placed.

Power Transmission Machinery.

The Reeves Pulley Company, Columbus, Ind., can see but little difference in their business since last month. Although they have materially increased their output it seems that orders have increased accordingly, and they are as far behind to-day as ever. They are also experiencing some serious difficulty in getting raw material, owing to the congested conditions of all foundries and metal working shops. From present indications it would seem absolutely necessary for them to add both new buildings and new machinery in order to meet the rapidly growing demand for variable speed transmission. While their orders cover almost all classes of industry, they perhaps sell more of their small transmission for iron working tools, such as lathes, planers, milling machines, drill presses, &c., than any other single line. In the larger sizes they have sold more of them for paper machines than any other service, and among other orders recently taken in this line are a No. 10 for Lincoln Paper Mills Company, Merriton, Ont.; No. 9 for Montrose Paper Company, Thorold, Ont.; a No. 9 and No. 7 for Scandinavian Peninsula, also a number for the United States. Their domestic business has so engrossed their attention that they have as yet but little time to devote to foreign trade, yet this has increased very rapidly and the outlook for the future is indeed flattering.

Pawling & Harnischfeger, Milwaukee, Wis., advise that the demand for cranes is well maintained, and that the condition of the machinery industry during February has been most satisfactory. The steel and iron industries still are the largest buyers, though the demand for steam railroads and electric light and street railroad companies is broadening. Inquiries from abroad are increasing, though the domestic market is of such strength and volume that foreign business need not be solicited. Orders for 55 cranes have been booked since the first part of the year, and sales since the last report to *The Iron Age* are partly represented as follows: Chicago & Eastern Railroad Company, Danville, Ill., three cranes; Western Tube Company, Kewanee, Ill.; the Westinghouse Machine Company, East Pittsburgh, Pa.; South Pennsylvania Oil Company, Folsom, W. Va.; the Pittsburgh Plate Glass Company, Ford City, Pa.; Ansonia Brass & Copper Company, Torrington, Conn.; Fairbanks, Morse & Co., Beloit, Wis.; St. Paul Foundry Company, St. Paul, Minn.; the Ingersoll-Sergeant Drill Company, Phillipsburg, N. J., 14 cranes; American Bridge Company, Ambridge Works, Economy, Pa., five cranes; the Standard Steel Works, Burnham, Pa.; City of Boston, Water Department, Boston, Mass.; Beloit Iron Works, Beloit, Wis.; International Steam Pump Company, Laidlaw-Dunn-Gordon Works, Elmwood Place, Ohio; Wheeling Steel & Iron Company, Benwood, W. Va.; the Coe Brass Mfg. Company, Torrington, Conn.; the McConway & Torley Company, Pittsburgh, Pa.; the Ironton Engine Company, Ironton, Ohio, two cranes; Joseph T. Ryerson & Son, Chicago; Hammond Iron Works, Struthers, Pa.; Cambria Steel Company, Johnstown, Pa.; American Bridge Company, Pencoyd plant, Pencoyd, Pa.; C. A. Lawton & Co., De Pere, Wis.; Perry-Matthews-Buskirk Stone Company, Bedford, Ind., two cranes; the Toledo Machine & Tool Company, Toledo, Ohio; American Sheet Steel Company, Wellsville Works, Wellsville, Ohio; Landis Tool Company, Waynesboro, Pa., three cranes.

Northern Engineering Works, Detroit, Mich., report a volume of business fully equal to the corresponding period of last year, and an increasing demand for electric traveling cranes. Among the electric cranes recently installed by this company, ranging in capacity from 3 to 40 tons, are mentioned the following: C. D. Jackson & Co., 25-ton crane; Detroit Ship Building Company, 5 cranes, 5 to 40 tons; Allis-Chalmers Company, Milwaukee, 12 cranes; American Ship Building Company, 3 electric cranes; P. A. Clum & Co., C. & G. Cooper Company, Macbeth Iron Company. They

have also installed hand power cranes of the traveling or jib type in the works of the Carpenter Steel Company, Insurance Stove & Range Company, Western Gas Construction Company, Mathewson Alkali Works, Colburn Machine Tool Company, five cranes; American Car & Foundry Company, Berwick, Pa., 24 cranes. They report an increased demand for cranes and foundry machinery for export, as compared with the corresponding period of last year.

The Link-Belt Machinery Company, Chicago, say that business so far this year has been quite satisfactory. The company have just completed a large addition to their plant, and now expect to be able to take care of everything that comes their way during the current year. Their principal business is with the home trade, although the company have a good foreign business, and at the present time have a representative in the Far East.

Stephens-Adamson Mfg. Company, Aurora, Ill., say that during the last month they have been extremely busy, especially in their power transmission department, having had some exceptionally good sized orders for large rope drives; one of these drives including nearly a carload of their heavy rigid ring oiling bearings, with sole-plates and wedges. They have added a new Niles boring mill to their equipment, which puts them in shape to make prompt delivery on anything in the line of pulleys and sheaves. Judging from the inquiries and orders they are receiving they look for an extremely busy season, and are already considering the installation of additional machine tools, which they feel they shall have to put in within the next 30 days to take care of increasing business.

The Northern Electrical Mfg. Company, Madison, Wis., report that they have not experienced any diminution in the demand. Their business for January was satisfactory, and present indications are that February and March will be even heavier. They say the new buildings completed during the fall and winter have enabled them to very materially facilitate deliveries and to add considerably to the possible volume of business.

The Industrial Works, Bay City, Mich., state that business continues satisfactory, and about the same in volume as in previous months.

The Crime of Conspiracy.

Following the conviction and fining of four Chicago brass molders for conspiracy to injure nonunion workmen, it is significant that a bill has been introduced in the Illinois legislature providing that hereafter no persons shall be indicted, prosecuted, tried or convicted in Illinois of the crime of conspiracy by virtue of any provision of the common law. The author of this revolutionary measure also had the temerity to introduce a bill to repeal sections 45, 46 and 46a of division 1 of the act to revise the law in relation to criminal jurisprudence. The sections of the law which it is designed to repeal are the three conspiracy sections of the criminal code. In commenting upon the proposed change in the laws of the State of Illinois, the member who introduced these bills is reported to have said that a charge of conspiracy is one of the relics of the dark ages. Does he hold that a day of enlightenment will have come when members of labor unions are permitted to hire men to maim and even kill nonunion workmen, without fear of punishment for entering into conspiracy for doing such an infamous act? It is to be hoped that the fair name of the State of Illinois will not be smirched by such legislation. On the contrary, the tendency to greater violence and bolder acts of criminality during strikes seems to demand more stringent laws for the maintenance of peace and order.

Rail Records at Edgar Thomson.—On the night of March 3 there were rolled at Edgar Thomson Steel Works, at Bessemer, 1356 tons of finished rails in one turn of 12 hours. The day turn on the same day rolled 1021 tons of finished rails in 12 hours, making a total of 2377 tons of finished rails in 24 hours, or within 3 tons of the best 24 hour record for rolling rails at this point, which is 2380 tons. This is remarkable work in view of the fact that the Kennedy-Morrison process for rolling rails has been used at the Edgar Thomson Works for more than a year, and by this process the steel is rolled at a very low temperature, and which is maintained even when such large records as the above are made. No change in temperature is made in the steel, either in the initial rolling or in the final pass, but the same heat is maintained regardless of output.

Cincinnati Machinery Market.

CINCINNATI, OHIO, March 9, 1903.

John T. Towsley, manufacturer of iron and wood working machinery, located on Evans street, has recently erected a large one-story brick addition to his shop and storeroom, which almost doubles his capacity. He is now putting in his own engine and boiler, which will furnish power and light. Business is reported to be on the increase, and he is using every endeavor to meet the demand for his tools.

Smith & Mills, builders of shapers from 12 to 32 inches, are doing a good steady business. They report orders coming in generally from all parts of the country, and all indications point to a prosperous business for the year.

The American Structural Iron Company have within the past week been incorporated with a capital stock of \$250,000, with George R. Scrughan, president; F. L. Snodgrass, vice-president, and A. T. Hazen, secretary and treasurer.

The Black & Clawson Company of Hamilton, Ohio, among the largest paper mill machinery industries in America, were recently sold to a syndicate composed of Bradford Shinkle, F. W. Whitaker, O. M. Bake and Ben Straus of Cincinnati. The company will be reorganized into a joint stock corporation, with a capital of \$1,000,000.

The plant of the American Tool Works Company, one of the largest of its kind in the world, will be extended and improved with the addition of men as necessity demands to meet the increase of business. As has already been mentioned in these columns, Messrs. Laidlaw and Egan have been succeeded by Messrs. Peck and Smith in the Board of Directors. They report business as excellent, and conditions extremely favorable for an exceptional year. Located on Eggleston avenue, with one of the great trunk lines of railroad passing their doors, they have special facilities for marketing their tools as well as receiving their supplies, which are switched directly into their plant. They observe that the outlook for foreign trade is somewhat brighter, and hope that the next few months may see a marked improvement in this direction.

The R. K. Le Blond Machine Tool Company, manufacturers of lathes and milling machines, are doing their utmost to keep abreast of orders being received from all sections of the country. They have recently completed and are now occupying their new two-story wareroom and shipping house, 80 x 100 feet in size. They are still of the opinion that heavier tools are in growing demand, and are bending their efforts accordingly. Foreign trade is not very good, although the inquiries received seem to indicate a slight awakening, which it is hoped will be productive of good results later.

Smith, Myers & Schnier report that while the year 1902 was one of the very best in their history, yet if January and February are any criterion 1903 will eclipse it completely. There has been an increased demand for large saw mill machinery from Southern points, and from Cuba and other foreign points comes the call for veneer mills. They are doing their utmost to keep pace with the orders received, but in some instances have found it impossible to do so on account of deliveries.

The John H. McGowan Company, builders of pumping machinery, are as busy as they can possibly be. The Southern markets are still vigorous, and there is a constant increase in the demand for their pumps in this section of the country. They will in a few days ship a very large compound pump to Gadsden, Ala., and also several large pumps to Cartersville, Ga., for the Chattanooga Furnace Company. They are adding to their equipment as occasion requires to meet the extra demand being made upon their resources. The outlook in the matter of receiving supplies is somewhat brighter, and delays are not so numerous as they were several months since.

The J. M. Robinson Company, makers of metal forming machinery, are well pleased with trade as they find it. They are now duplicating one of their largest bending machines, which will be ready for shipment in a very short time. Orders which are coming in are general and indicate a healthy condition throughout the country. They have recently added some new machine tools and contemplate greater expansion in the near future.

The Bickford Drill & Tool Company are receiving their share of the trade and are exceptionally busy. Their new Bickford radial, made in 4, 5 and 6 foot sizes, plain, half universal and full universal style, of which mention was made in a former letter as having been recently placed on the market, has proved a great success and promises to be a drawing card for their tools.

The J. A. Fay & Egan Company, manufacturers of wood working machinery, report trade exceptionally satisfactory. They have of late received quite a number of foreign orders and are pleased with the prospects of an increasing demand from this source. They are being crowded to their full capacity and the future has a very bright look.

The Bouman & Wilson Foundry Company, formerly known as the Hoffnung & Laue Foundry Company, are very busy both at their Norwood and Cincinnati plants. Last year they made one of the largest castings ever run out of one cupola for the Bullock Electric Company. This

casting weighed 75,000 pounds. They also made 40 castings weighing 40,000 pounds each, for the new Cincinnati water works. They have increased their force about 33 per cent., and their plant at Norwood, which is 100 x 200 feet, proving too small, they will in the near future begin the erection of buildings which will increase their output very materially.

The Cincinnati Shaper Company, who have recently removed to their new quarters in the west end of the city on Elam street, report trade conditions as excellent, with inquiries and orders so numerous that, notwithstanding their increased capacity, extra efforts on their part will be needed to make deliveries as required. The offices in connection with their plant, which are on the second floor, are commodious and well arranged, with excellent light and ventilation.

The Lodge & Shipley Machine Tool Company are very busy looking after their largely increased trade and endeavoring to solve the problem of early deliveries. The outlook is especially promising, and, with the increased facilities at their command, they expect the year before them to completely overshadow any previous one in their history.

The Cincinnati Punch & Shear Company are having an excellent year, the best in fact that they have ever had, and from the inquiries being received from all sections it looks as though their utmost endeavors would be necessary to meet the demands made upon them. There still seems to be a growing demand for larger and heavier machines, and the only question that perplexes them is the ability to deliver.

The Lane & Bodley Company report that their new foundry plant being erected at Bond Hill, near this city, will probably be ready for service some time in May. This building, which is 130 x 300 feet in dimensions, has all of the iron and part of the brick work completed. They will also soon begin the erection of a large machine shop in connection with this foundry, which will be one of the largest in the country and equipped with all of the latest and best machinery. In addition to the practical features their workmen will be given all the modern conveniences.

Pothoff & Frey, architectural iron workers, are very busy looking after the many new buildings now being erected and in contemplation in the city. The Traction Company Building at Fifth and Walnut they have about completed. They are well pleased with the outlook, and the coming year promises to be a large one in their line.

The Queen City Brass & Iron Works report business on the increase and prospects bright. They have been compelled lately to increase their equipment about 50 per cent. to accommodate the large increase in the volume of trade. They are having some foreign inquiries, and have recently received orders for some of their output from Australia. Domestic trade is very general, in fact much more so than for some time previous. They expect in the near future to erect additional buildings to take care of their foundry interests.

The John Steptoe Shaper Company are well satisfied with the outlook, and expect soon to add additional buildings and equipment, which will enable them to materially increase their volume of trade.

The I. & E. Greenwald Company, builders of engines and also large manufacturers of gears, report the demand for all their products exceedingly good. Orders for engines are well distributed over the territory in which they seek trade, and they are now estimating on a number of orders for very heavy engines. The trade in coal washing machinery is also good, and several contracts are now under construction. The gear trade has been unusually heavy, and seemingly is on the increase. They have recently completed quite an addition to their plant and their buildings now about Eggleston avenue, where they have excellent facilities for receiving and delivering.

The Passaic Steel Company's Officers.—We have received from the Passaic Steel Company, Paterson, N. J., a complete list of the officers of the company, which is as follows: Board of Directors—Henry F. Bell, president Citizens' Trust Company, Paterson, N. J.; J. Barclay Cooke, secretary and treasurer, Paterson, N. J.; Walter E. Cooke, lawyer, New York City; A. C. Fairchild, president, Paterson, N. J.; Charles Harris, iron and steel, New York City; Stanley R. Ketcham, treasurer Transit Finance Company, Philadelphia, Pa.; George A. Lee, chairman Transit Finance Company, Philadelphia, Pa.; B. Nicoll, pig iron, New York City; Dudley Phelps, Knevals & Perry, New York City; F. F. Searing, vice-president Citizens' Trust Company, Paterson, N. J.; Thomas B. Simpson, president Transit Finance Company, Philadelphia, Pa., and Louis A. Watres, president Title Guarantee & Trust Company, Scranton, Pa. The officers elected by the board are as follows: A. C. Fairchild, president; F. F. Searing, vice-president, and J. Barclay Cooke, secretary and treasurer.

HARDWARE.

AT the present time, with the great pressure on the manufacturing capacity of the country and the inability of many of the plants to turn out goods in sufficient quantities to meet the requirements of the trade, there is comparatively little complaint by manufacturers of the lack of profit. With most of them the margins are good and the result of the work of the past few years has been to strengthen them in their position commercially and financially, their plants meanwhile giving evidence of prosperity by their enlargement and improved equipment. This is unquestionably the ideal if not the uniform condition of manufacturing enterprise. There are, however, doubtless many manufacturers even at this time whose experience is far from satisfactory, inasmuch as they are selling goods on exceedingly meager margins, and, in not a few cases, at an actual loss. Nearly all manufacturers indeed who have been in the field for any considerable number of years recall times when an unsatisfactory condition of things has prevailed and when some at least of their products for one reason or another were marketed without adequate profit, if not actually below cost. The upbuilding of many a manufacturing business has been a checkered story, with intermittent periods of prosperity and adversity, of lean and of fat years. It may be assumed that in the ebb and flow of the tides of commercial activity this experience will be repeated in the years to come.

The lack of adequate profit in the marketing of goods often accompanies the establishment of what is after a while a successful and remunerative business. Many a concern has grown from a small beginning to a noble place in the market, although they started out with facilities that were not equal to those of their older and stronger competitors, and with the disadvantage of inexperience. With the close prices which they have had to meet it has often been a long, hard and unremitting struggle to obtain a foothold. So serious are difficulties of this character that time and time again the invested capital has been sunk, and not infrequently the enterprise abandoned, or passed over into other hands, as the obstacles were found to be insurmountable. On the other hand, many an important manufacturing business has been developed in spite of these difficulties and success at last achieved.

Low and unprofitable prices are, however, often deliberately made by manufacturers with a view to rendering the production of the goods affected so unremunerative that competition will be discouraged or driven from the field. A fierce cut is accordingly made, which tests the facilities of other manufacturers and perhaps closes their works temporarily or permanently. The loss on lines thus affected is in such cases the result of a deliberate policy adopted by manufacturers of recognized position under the conviction that in the long run it will be to their advantage. Many instances will occur to our readers of cases in which this forcing down of prices has induced much irregularity in the market. While it is often good policy for the established makers and is successfully adopted, it is a course which not infrequently is attended by serious disadvantages and fails in the end to accomplish its purpose. The laws of trade seem sometimes to be on the side of the smaller producer as against his great rival, and many a comparatively insignificant manufacturer has succeeded in holding his own against the most strenuous efforts of a formidable competitor.

The sympathy of the trade generally and of the public at large is certainly with those who are striving to establish themselves in the face of formidable opposition, and whether or not laws shall be enacted, as has been proposed, to prevent the sale of goods below cost, there is little doubt that the practice is seldom good policy and is in general to be condemned.

In both the cases we have been considering the selling of products without adequate profit is done deliberately and under the pressure of a real or actual necessity which justifies it in the judgment of the manufacturer. There are, however, undoubtedly many instances in the Hardware as in other fields in which goods are sold at a loss simply through ignorance. The manufacturer does not know what they cost. This is owing primarily to the fact that many manufacturers in their inexperience do not recognize the importance of knowing the cost of the various articles which they are producing and hence do not take the trouble to institute systems which will give them this information and be a guide to them in the making and selling of their goods. Where a plant is turning out a few great products this is a comparatively easy task, but in a field like that of Hardware, with its countless variety of articles, many of them of a simple and inexpensive or sometimes of a complicated character, the problem is much more difficult. Some manufacturers, indeed, frankly concede that the cost of their goods is to a large extent a matter of conjecture, and they are satisfied if at the balancing of the books a profit is shown on the whole business, even though some lines may possibly have been sold at a loss. This is an obviously undesirable and mischievous condition. The effort should be made patiently and consistently to know what each article costs. Inexperienced manufacturers are those who most frequently ignore this matter and put goods on the market at prices which are a puzzle to their older and better equipped competitors. Instances will occur to those familiar with the Hardware market in which at one time or another prices in various lines have been demoralized by low figures made by the manufacturers who were not aware that they were selling at an actual loss. This is a matter which lies near the foundation of successful manufacturing enterprise. A man starting a new business may be obliged sometimes to make goods without adequate profit. After the business has been established it may sometimes be policy to force prices down to an unprofitable level, but if the sale of goods at a loss is due to ignorance of their cost, there is no explanation consistent with good business management.

Condition of Trade.

With the progress of the season business is becoming more generally active. Traveling salesmen are cultivating their territory and almost uniformly giving a good account of themselves. Merchants are generally in a mood to buy liberally, and the volume of current business throughout the country even at this comparatively early stage is very satisfactory. Complaint of difficulty in getting goods is frequently heard and the majority of manufacturers are behind their orders. Prices are as a rule firm and steadily held. The high cost of material, fuel and labor, and the transportation difficulties, coupled with the active demand, unite in giving strength to the market for manufactured products. Notwithstanding this very satisfactory condition there is more or less cutting on the part of the jobbing trade, where their stocks purchased at low prices or at broad margins justify it, or the exigencies of competition require it. A few lines are in an uncertain and

unsatisfactory condition as, for example, Axles and Axes, owing in one case to the moderate demand, and in the other to the possibility of lower prices as a result of lack of unity among the Axe manufacturers. The strength of the Copper market is having its effect upon goods of which this metal is an important part. Foreign business is continuing in good volume, and notwithstanding the high prices ruling here, closer and more important relations with foreign buyers are constantly being established.

Chicago.

(By Telegraph.)

Beyond the accelerated movement in spring goods the past week has not been productive of new features of special interest in Hardware channels. There continues to be a general hardening tendency all along the line and naturally the recent advance in Tin Plate is expected to be reflected in Tinware. Galvanized goods, too, are stronger, and there are again rumors of a possible advance in price of Augers, Chisels, &c. Wire Goods, too, are firmer because of the higher prices prevailing for Wire. Both manufacturers and jobbers report much annoyance through the irregular service of the railroads, not only because of delayed shipments, but because of cars going astray, preventing not only the filling of contracts promptly, but causing more or less pecuniary loss, but notwithstanding the continued aggravating delays in receiving goods the distribution service from Chicago is much better. It is reported that there is a better understanding among the associated manufacturers of Door Hangers, but the situation in Strap and T Hinges, from the manufacturers' view, is without improvement. Some jobbers report quite an influx of orders for Lawn Mowers and Scythes and increased business for Scoops, Shovels, Axes and Saws for fall delivery. Manufacturers of Wire and Nails are still hampered by inadequate transportation facilities for the distribution of their goods, and many mills are deprived of an adequate supply of Coke to allow running full time, but some improvement has been experienced and a decidedly better condition is anticipated in the near future, if labor difficulties do not again throw the entire business machinery out of gear. Heavy Hardware merchants report an active movement in nearly all the goods they are handling, including Blacksmiths' Supplies, Wagon Materials, Bolts, Nuts, Washers, Bars and small Structural Shapes. The increased movement in specialties and side lines continues to be a prominent feature of the trade. The demand for Paints is especially good, as is also the trade for Bristle goods. Jobbers note a more active demand for Galvanized Sheets and Tin Plate, and other roofing supplies. There has been quite a decided improvement in the order trade for Builders' Hardware, including several large contracts for future delivery.

St. Louis.

(By Telegraph.)

Any lighter run of business in the Hardware market that might have been apparent last week has been lost sight of in the days subsequent to last report, and affairs can now be said to be keeping to a high mark. Order books are showing heavier entries as the time for spring weather approaches, the present activity being great in Shovels, Spades, Hoes, Rakes—in fact, in about all classes of Steel goods—as well as Poultry Netting, Screen Doors, Window Screens, and many other seasonable lines. Sporting Goods are an important item and the very heavy demand speaks well for the coming season's popularity of baseball and other outdoor pastimes. It is a well-known fact that the profit from last year's abundant harvest was large and the buying from the farming districts of Poultry Netting and repairs for fences, &c., goes to show the good financial condition of the farmers and their enterprise to put their farms in first-class order during the prosperous days. Many persons are launching out into the Hardware field, and we hear of a number of opening stocks in the South and Central West. The floods which are now prevailing in many parts of the West and South are causing consider-

able damage, but thus far seem to have been helpful to the Hardware jobber, increasing the demand to a considerable extent for Wheelbarrows and Shovels.

NOTES ON PRICES.

Wire Nails.—The recent conditions ruling in the market continue without material change. The difficulties in the way of prompt shipments have not been wholly removed, including the congested state of transportation facilities and the large business which has been booked by the mills. The tone of the market remains firm. Arguments of some force are used as to the improbability of an immediate advance in prices. These are to the effect that the largest factor is conservative about unduly advancing prices on its product, and that higher figures would invite competition from mills which have to purchase material from which to make Nails. These considerations might not, however, stand in the way of an advance under certain conditions. Quotations are as follows:

Jobbers, carload lots.....	\$2.00
Retailers, carload lots.....	2.05
Retailers, less than carload lots.....	2.15

New York.—Demand is fairly good, and inquiries from territory tributary to this point are quite numerous, indicating that requirements for Nails are urgent. Quotations are more closely adhered to than for some time, and are as follows: Single carloads, \$2.20; small lots from store, \$2.25 to \$2.30.

Chicago, by Telegraph.—The mills are somewhat embarrassed by the large amount of business offering, considering the condition into which they are thrown by reason of the continued difficulty in obtaining ample fuel supply to run full time and also the difficulty in making distribution of goods already produced. Specifications on old contracts continue liberal and among the jobbing trade a further advance is rumored, although nothing tangible comes from the manufacturing end of the market. The jobbing trade has been of liberal proportions and prices have remained unchanged on the basis of \$2.20 in carload lots and \$2.30 in less than carload lots, these prices being made to retailers, carload lots to jobbers being 5 cents less.

St. Louis, by Telegraph.—A very considerable and well sustained demand is ruling for Wire Nails. In less than carload lots jobbers quote \$2.35.

Pittsburgh.—The trade are sending in liberal orders for Wire Nails, and specifications on contracts placed before the recent advance in prices are coming in quite freely and the mills have a large amount of business on their books. Indications are that there may be a shortage of Wire Nails owing to heavy demand. The tone of the market is firm and we quote Wire Nails at \$2 in carloads to jobbers, \$2.05 in carloads to retailers and \$2.15 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days; for Galvanizing Nails 75 cents per keg is charged and for Tinning Nails \$1.50 per keg extra.

Cut Nails.—There is still some difficulty in getting prompt shipments, owing to the shortage of Steel and the congested condition of the railroads. Demand continues steady at the following quotations: \$2.10, base in carloads, and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off 10 days.

New York.—During the week there has been a scarcity of leading sizes of Nails in jobbers' hands, owing to delayed shipments. The demand is steady and the market firm. Quotations for carloads and less than carloads at the advance are as follows:

Carloads on dock.....	\$2.24
Less than carloads on dock.....	2.28
Small lots from store.....	2.35

Chicago, by Telegraph.—Manufacturers have received a liberal patronage for March shipments, and the market is a little firmer in tone, although the jobbing trade is not especially active. There is still much difficulty in making prompt shipments. Sales have been made to retailers on the basis of \$2.26½ in carload lots and \$2.36½ in less than carload lots for Steel, Chicago. Iron

March 12, 1903

Nails are selling in a small way as high as \$2.50 per keg from store, Chicago.

St. Louis, by Telegraph.—The demand for Cut Nails is along fair lines, and in small lots from store quotations are as follows: Steel, \$2.43 and Iron, \$2.55.

Pittsburgh.—Manufacturers report a very good demand for Cut Nails, the trade buying quite freely, in the belief that at the next meeting of the Cut Nail Manufacturers' Association there may be a slight advance made in prices for April shipment. Steel continues scarce and high in price, and the congested condition of the railroads, together with the advance in prices of Wire Nails, are all in favor of a higher market on Cut Nails. Prices are firm, and we quote: Steel Cut Nails, \$2.10, base, in carloads and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days. Iron Cut Nails take 10 cents advance over Steel.

Barb Wire.—The tone of the market is firm, with the continued heavy demand. Mills are also shipping on contracts made before the recent advance. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.30	\$2.60
Retailers, carload lots.....	2.35	2.65
Retailers, less than carload lots.....	2.45	2.75

Chicago, by Telegraph.—Specifications, accompanied by renewal orders, continue to be received by manufacturers in liberal amount. In fact, with the mills crippled at both the producing and shipping end the business offering is such as to cause uneasiness, but some improvement is reported in the outlook, as far as increased capacity is concerned at least. Galvanized sells at \$2.80 in carload lots and \$2.90 in less than carload lots, Chicago. Staples have been selling well at \$2.35 in carload lots and \$2.45 in less than carload lots.

St. Louis, by Telegraph.—A very good volume of business for Barb Wire continues, and the jobbers look for an increased movement in this line. In small lots from store Painted is quoted at \$2.60 and Galvanized at \$2.95.

Pittsburgh.—A very heavy tonnage in Barb Wire was placed before the advance in prices and present demand is large, so that the mills are well filled up. The jobbing trade are pretty well covered, but the small buyers are sending in good sized orders. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, \$2.30; Galvanized, \$2.60 in carloads to jobbers; Painted, \$2.35; Galvanized, \$2.65 in carloads to retailers; Painted, \$2.45; Galvanized, \$2.75 in small lots to retailers.

Plain Wire.—The market continues in about the same condition as for some time. The current demand and contracts already placed are keeping the mills well occupied. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95
Less than carloads.....	2.05
The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:	
6 to 9 10 11 12 & 12½ 13 14 15 16 17 18	
Base \$0.05 .10 .15 .25 .35 .45 .55 .70 .85 Plain.	
\$0.30 .35 .40 .45 .55 .65 1.05 1.15 1.70 1.85 Galv.	

Chicago, by Telegraph.—The mills are heavily booked for several months, with ample specifications on hand and some little business offering. The difficulty of distributing the product and the stumbling blocks in the way of getting raw material continue to be the prominent features. The jobbing trade has been fair and the market has continued strong. Nos. 6 to 9, in carload lots, are selling at \$2.10 on track and \$2.20 from store. Galvanized bringing 30 cents extra for Nos. 4 to 14.

St. Louis, by Telegraph.—Jobbers report business to be in very good shape for Plain Wire, and the market is on a firm basis. No. 9 is quoted at \$2.25 and Galvanized at \$2.55 in small lots from store.

Pittsburgh.—We note a heavy demand for Plain Wire, and the mills are having great trouble in getting cars in which to ship their product. This is causing some-

thing of a scarcity in supply of Plain Wire for prompt delivery. The tone of the market is very firm, and a further advance in prices is anticipated by the trade. We quote: Plain Wire, \$1.90, base, for Nos. 6 to 9 in carloads to jobbers, \$1.95 in carloads to retailers and \$2.05 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

Screws.—The announcement of the advanced prices on Wood Screws was received by the trade generally with satisfaction, as it has been recognized that the price has heretofore been unreasonably low. The new quotations are being firmly maintained by the manufacturers, practically all of whom are in the combination. There is, however, more or less irregularity in the prices at which the jobbers are selling the goods, as most of them had laid in ample stocks, anticipating that in the natural course of things there would be a reaction from the demoralized prices which have been ruling. The arrangement between the manufacturers was, however, consummated so promptly that it came as something of a surprise to the trade generally.

Axes.—The market for Axles is not in a very satisfactory condition owing to the fact that the demand is disappointing. During the past few months the volume of business has been much less than the manufacturers would naturally expect, a condition which is due to an overstock of Vehicles and materials for them accumulated during the past season, when the business did not amount to what was anticipated. Prices are, however, quite firmly maintained, and an advance of 10 per cent. has recently been made in Nos. 11 to 14. Some of the manufacturers have the impression that customers are looking for lower prices before the close of the season, but the limited demand is generally accounted for by the overstocks in the hands of dealers and manufacturers.

American Screw Company.—American Screw Company, Providence, R. I., issue a discount sheet showing the new prices on Wood Screws, which were referred to in our last issue. It also gives discounts on Machine Screws, Cap Screws, Side Knob Screws, Tire Bolts, Sleigh Shoe Bolts, Stove Bolts, Rivets, Dowel Screws, &c.

Shot.—An advance has been made in the price of Shot under date March 10. The new prices are as follows: Terms, net cash, 30 days, or 2 per cent. discount for cash in 10 days:

	25-lb. bag.	5-lb. bag.
Drop Shot sizes smaller than B.....	\$1.40	35c.
Drop Shot, B and larger sizes.....	1.65	40c.
Buck Shot.....	1.65	40c.
Chilled Shot.....	1.65	40c.
Dust Shot.....	2.00	50c.

Copper and Brass Goods.—The advances in ingot copper since January 1, from 12½ cents to 14½ cents for electrolytic, with ½ cent higher for Lake, have necessitated corresponding increases in the prices of goods into the composition of which that commodity enters. Soldering coppers are 1½ cents per pound higher than they were a month ago, when the base was 16½ cents, now 18 cents, with indications of a further advance soon. Sheet Brass and Brass Wire have advanced three times in ten days, the discount now being 30 per cent., instead of 40 per cent. as formerly. Brass Rods and Brazed Tubes have advanced to 33 1/3 per cent. discount. In Rivets and Burs and seamless tubes, brass or copper, there is no change. Copper Wire both bare and insulated has followed the market for ingot very closely, the price being about 1 cent per pound advance on the price of ingot copper, the base price for Bare Wire being 15½ cents at present. The manufacturers are in conference to-day and considering whether or not any further changes may be advisable.

Cordage.—Demand for Rope is very fair, while some manufacturers have booked a number of large orders. Manila Rope, on the basis of 7-16-inch and larger, is quoted from 11½ to 11½ cents, according to maker. Sisal Rope is made to a price, and quotations on the above basis range from 8 to 10 cents per pound, according to quality. Both kinds of Rope are subject to a rebate of ¼ cent per pound in large quantities.

Paris Green.—Buyers very generally covered their requirements earlier in the season, so that at the present time there is but little activity in the market. While there is no change in card prices, the market is not exceptionally strong under present conditions, notwithstanding the advancing tendency of the Vitriol market. Quotations are as follows:

Paris Green.

	Per lb.
Less than 1 ton.	
Arsenic kegs or casks.....	13½c.
Kegs, 100 to 175 pounds.....	14c.
Kits, 14, 28, 56 pounds.....	15c.
Paper boxes, 2 to 5 pounds.....	15½c.
Paper boxes, 1 pound.....	16c.
Paper boxes, ½ pound.....	16c.
Paper boxes, ¼ pound.....	17c.
One to 5 tons, 1 cent per pound less; 5 tons and over, 1½ cents per pound less.	

Paints and Colors.—*Leads.*—Manufacturers are reported as having entered large contracts for White Lead in Oil, and current demand is active. Shipments are more or less delayed on account of insufficient transportation facilities. Quotations for best brands are as follows: In lots of 500 pounds or over, 6½ cents; in lots of less than 500 pounds, 6¾ cents per pound.

Oils.—*Linseed Oil.*—Owing to the continued decline of Flaxseed, the Linseed Oil market shows weakness. This is particularly noticeable in State and Western brands, which are quoted at 41 to 43 cents per gallon for Raw, according to quantity. City Raw is quoted at 46 to 47 cents per gallon, according to quantity. Large buyers are not in the market, but there is a fair demand for small lots.

Glass.—The Associated Window Glass Companies have failed to secure sufficient signatures of outside Glass manufacturers to make the plan feasible to close all factories during March and April. It is reported that it is the intention of the American Window Glass Company to put the fires out of all except their machine equipped plant at Alexandria, Ind., about the middle of this month, and to introduce the machines at their various factories as rapidly as possible, so that when the time for starting factories in the fall arrives the company will have several factories in blast, which can be run continuously without being affected by summer stops or scarcity of blowers, making Glass, it is asserted, from 40 to 50 per cent. cheaper than it can be made by the old method. The present condition is that part of the last allotment of 1,250,000 boxes of Glass, made early in the present year, is still in the course of delivery to members of the Jobbers' Association. When news was received of the failure of the plan for early closing of the factories, the Jobbers' Association tried to cancel their order for the balance of the undelivered glass, but were not allowed to do so by the manufacturers. Jobbers at this point have disposed of a very small percentage of the new glass. If the half million or more boxes of glass which are supposed to be stored at the factories are thrown on the market at a price to move it, the Jobbers' Association might take them to protect themselves. The factories outside the combination represent about 30 per cent. of the producing capacity of the country, and the Independent Window Glass Company and the Federation Glass Company may sell glass at any price they see fit, either in their present formation of associated factories or working independently of each other. Ruling conditions are too new to form any definite opinion regarding the immediate future, except that it is an unsatisfactory market to buy on.

Spirits Turpentine.—The Turpentine market is quiet with light demand. Quotations, according to quantity, are as follows: Southerns, 67½ to 68 cents; machine made barrels, 68 to 68½ cents per gallon.

THE MOUNT CARMEL BOLT COMPANY, Mt. Carmel, Conn., have disposed of their Wood Screw department to the American Screw Company, Providence, R. I. This transaction includes all Wood Screw machinery, stock and good will of business. It does not in any way touch on the company's other lines of Bolts, Nuts, Rivets and Machine Screws, the manufacture of which will be continued with increased facilities.

TRADE ITEMS.

F. W. SMITH, president of the Smith & Egge Company, Bridgeport, Conn., together with Mrs. Smith, recently celebrated their golden wedding, having been married in Bridgeport, February 23, 1853. Mr. Smith was born in Kortright, Delaware County, New York, nearly 74 years ago. At an early age he accepted a clerkship in New York City and later went to New Haven, where he was employed in a dry goods store until 1849, when he went to Bridgeport and started in the same kind of business on his own account. Following the election of Abraham Lincoln and soon after his first inauguration, Mr. Smith was appointed Postmaster of Bridgeport, which office he held for eight years. In 1873 he organized the Smith & Egge Mfg. Company, of whom he is still the head.

THE CLYDE CUTLERY COMPANY, Clyde, Ohio, established in 1850, have opened a New York office, under the management of U. J. Ulery, at 290 Broadway, who will look after both export and nearby trade. The business of the Clyde Cutlery Company is almost exclusively the manufacture of fine Butcher Knives. Mr. Ulery will be remembered as the New York manager of the International Cutlery Company, Fremont, Ohio, the New York branch of which business he still looks after, he having been with that company and their predecessors for 15 years.

THE J. BARTON SMITH COMPANY, Philadelphia, Pa., on and after April 15, will remove to their new factory corner of Howard and Norris streets, Philadelphia. They have erected a commodious, modern building at this address, equipped with all improvements and most recent types of machinery. They will have double the former floor space and three times the facilities for production. The removal will be made without any interruption in their business.

LOCKWOOD HOTCHKISS, SR., died January 31, at Ansonia, Conn. He had been engaged in the Hardware business since 1867. Mr. Hotchkiss was born in Derby, now Ansonia, August 4, 1826. In 1867 he associated with Nathan S. Johnson and established the Hardware business with which he has since been continuously identified. The firm name for years was Johnson & Hotchkiss, until Mr. Hotchkiss succeeded as sole proprietor. He is survived by a widow and five children.

WILLIAM H. TUTHILL, secretary of the Tuthill Spring Company of Chicago, is making an extended trip through Cuba, Jamaica, the Lesser Antilles and South America, expecting to return by way of Portugal and the Mediterranean Sea. He takes the trip for rest and recreation, expecting, however, at the same time to look after the interests of his company.

AT a meeting of the stockholders of the Cream City Woven Wire Works, Milwaukee, held recently, it was decided to increase the capital stock from \$100,000 to \$150,000. The old directors and officers, which are as follows, were re-elected: F. L. Kunkel, president and treasurer; P. Sibenaler, vice-president; A. H. Hammetter, secretary; Philip Gross and Wm. Hopp. The company anticipate the output of the present year to be the greatest in their history.

G. FRED. COLLINS has resigned his position with B. M. Jones & Co., Boston, and will be succeeded in the Eastern department of their business, on April 1, by Richard L. Thomas, long and favorably known in the Railway Supply trade. Mr. Thomas will continue to act for the National Lock Washer Company also.

J. D. RAWLES, for many years connected with Bigelow & Dowse Company, Boston, and later with Butts & Ordway Company, has associated himself with Frye, Phipps & Co., wholesale Hardware merchants, Boston.

GRAVES, BROWN & CO. have purchased the business of Bolles & Wilde Company, Boston, Mass., and will continue the wholesaling of Hardware at the old stand, 93 and 95 Pearl street.

Bishop & Lindquist Hardware Company, Des Moines, Iowa, have been succeeded by Gross & McGarraugh, who will continue at the old stand.

NEW YORK STATE ASSOCIATION OF RETAIL HARDWARE DEALERS.

THE first annual convention of the New York State Association of Hardware Dealers opened at the Astor House, New York City, on Monday, March 9, with a meeting of the board of officers at 2 p.m. On the following day the Board of Directors met and made arrangement in some detail for the sessions of the convention.

The first public session for the members and guests was called to order at 10 o'clock Wednesday, in Parlor 74, by W. D. Hallowell, the first vice-president of the association, who was in the chair owing to the absence of President H. D. Hull of Troy, who was detained at home by the serious illness of his wife. Geo. F. Wiepert of Sargent & Co., explained that George H. Sargent who was to extend the welcome to the members, was unable to be present on account of illness. R. R. Williams, Hardware Editor of *The Iron Age*, was then called upon and made a brief address of welcome.

The roll call followed, which showed a goodly representation from all parts of the State. The secretary, John R. Taylor of Little Falls, then read letters from C. J. Rumsey & Co. and Barr Bros. of Ithaca, explaining that they were compelled to stay away, owing to the sickness there. A letter was also read from President H. D. Hull, explaining his absence. The secretary read the names of committee chairmen that had been appointed, and also of some of the complete committees.

At the opening of the part of the meeting given up to discussion of subjects, the secretary called attention to the Question Box that had been placed in the room, into which the members were asked to drop any questions that they desired to have brought before the convention.

John B. Foley of Syracuse then moved that a communication be sent to President Hull as an expression of their sympathy and regret at his absence.

Addresses were then made by the following gentlemen, who are active in the formation of a Connecticut State Association: A. H. Abbe of A. H. & E. W. Abbe, New Britain, Conn., president of the Hartford Hardware Association; W. A. Church, manager of the F. Hallock Company, Derby, Conn., and president of the Derby, Shelton and Ansonia Hardware Association; F. W. Hallock, secretary of the F. Hallock Company, Derby, Conn., and ex-president of the Derby, Shelton and Ansonia Hardware Association; C. L. Way of the Way Hardware Corporation, Hartford, Conn., and secretary of the Hartford Hardware Association. S. S. Bryan, Titusville, Pa., then made some brief remarks, and called the attention of the members to the advantages of forming a State Retail Hardware Fire Insurance Association.

H. G. Cormick, president of the National Retail Hardware Association, followed with an interesting address, in which he told of the good work of the National Association.

In the afternoon a reception was tendered to the guests of the association, and an informal discussion held on several points of interest to its members.

The Thursday morning session will probably be the most important of the convention, and will be of an executive character, for the members only. The printed programme called for the annual address by the president, annual reports of secretary and treasurer, report of Committee on Nominations, election of officers and general discussion. At the Thursday afternoon session there will be addresses by H. R. Towne, of Yale & Towne Mfg. Company, and by H. G. Cormick, president of the National Retail Hardware Dealers' Association, and a general discussion.

E. A. KING, president of the St. Joseph Pump & Mfg. Company, St. Joseph, Mo., has been elected a member of the Board of Directors of the First National Bank of Buchanan County. Mr. King is also manager of the Missouri Anchor Fence Company.

The Mt. Calm Hardware Company, Mt. Calm, Texas, have been incorporated with a capital stock of \$7500.

NATIONAL RETAIL HARDWARE DEALERS' ASSOCIATION.

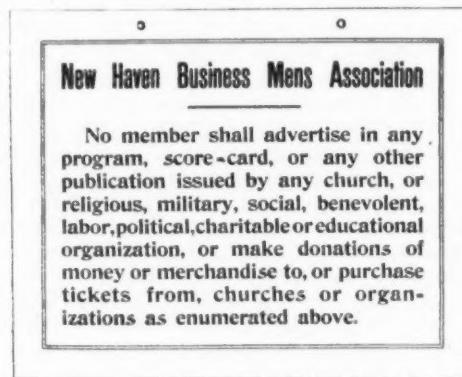
A MEETING of the Joint Committee appointed by the Chicago Retail Hardware Association and the Hardware manufacturers of the city was held at the Sherman House, Chicago, on Monday, March 9, to make arrangements for the entertainment of the delegates to the convention of the National Retail Hardware Dealers' Association, which will be held at the Briggs House, Chicago, March 16 to 18, inclusive. W. H. Bennett was chosen chairman and G. R. Lott secretary of the Joint Committee. The committee representing the Chicago Retail Hardware Association is as follows: W. T. Gormley, J. L. Smith, Z. T. Miller, H. E. Gratt and G. R. Lott. It was decided that a banquet be given the visiting delegates Tuesday, March 17, at the Sherman House. D. W. Simpson of Aurora, Ill., will be toastmaster. A committee will be appointed to welcome and entertain the visiting delegates.

SOUTHERN CALIFORNIA RETAIL HARDWARE & IMPLEMENT ASSOCIATION.

THE annual meeting of the Southern California Retail Hardware and Implement Association was held at Los Angeles on the 18th ult. A fair representation of the membership was in attendance. A feature of the meeting was the reading of an excellent paper by M. C. Faulding of Santa Barbara. The following officers were elected: President, J. W. Hellman, Los Angeles; vice-president, Wm. J. Lutz, Santa Ana; treasurer, S. M. McKee, Los Angeles; secretary, C. W. Damerel, Los Angeles. Executive Committee: W. C. Borth, G. M. Cooley, H. L. Graham, H. Geohegan, F. P. Nickey, O. C. Bichowsky.

ADVERTISING IN CHARITABLE PUBLICATIONS

IN some sections advertising in programmes, papers, &c., gotten out by charitable, social and educational institutions has been sought in such a quantity and so persistently that retail merchants have felt constrained to decline such advertising, owing to the fact that they can trace no returns from it. The New Haven (Conn.) Business Men's Association has decided that



Advertising in Charitable Publications.

the advertising of this kind has become such an evil that it required united action on their part. They accordingly passed a resolution prohibiting their members from advertising in such publications, and supplied each member with a card reproduced in the accompanying illustration. This card measures 11 x 14 inches, and is supposed to be hung in the store of each member of the association. A prominent member told a representative of *The Iron Age* that while he had not reduced his legitimate advertising since the adoption of the resolution, that the money expended on his advertising account was considerably less than heretofore; the difference being accounted for by the charitable advertising he was formerly forced to do and for which he received no return.

SOURCES OF SUPPLY.

BY C. G. AMBLER.

EVERY buyer has occasion frequently to know where he can get goods of some particular description or special brand other than those that are regularly kept on hand. This necessity usually arises on account of a demand for some article which it is not considered desirable to keep in stock. For regular requirements he is more or less familiar with the source of supply according to the frequency of his orders in the several lines, and his memory may be aided by memoranda in the price book.

Advantages of the System.

A book containing memoranda of sources of supply, or better still, a card system, with the matter alphabetically arranged, will be found to be very helpful. A good system of caring for catalogues with index is invaluable for reference at all times. In addition to that a system as suggested will be a great time saver, for it may be kept within convenient reach and will often give the desired information at a glance, or at least will indicate as quickly whose catalogue should be consulted.

The Arrangement.

The book, or cards, should be ruled vertically, dividing the page into four spaces with the following headings: Article, Style, Manufacturer, Jobber, as shown

Article.	Style.	Manufacturer.	Jobber.
Groves & screen	Automatic & hand made	Stoddard, Pratt & Griswold, Mass.	
"	"	Clark Mfg. Co., Worcester, Mass.	
"	"	A. Mann, Co., Buffalo, N.Y.	
"	"	Bellinger & Gleason, New York, N.Y.	
Dryers & blower	Portable, Tool, Screen Room, Fire, and Service.	L. S. Garrett, Co., W. Med. Mass.	
"	Yankee automatic	North Bros. Corp., Philadelphia, Pa.	
Dryers & blower	Champlain & Albany	Will Dryer Co., Worcester, Mass.	
"	Portable, Folding	M. C. Goddard, 5th & 20th Streets, Philadelphia, Pa.	

Sources of Supply.

herewith. A fifth space may be added if desired, to be used as a catalogue index. The second space might be wide enough to allow of a descriptive term, when desired, in addition to the manufacturer's brand.

Using the System.

As an example of the use of the system: Suppose a customer calls for a particular kind of Spring Hinge which is not kept in stock. It is not enough to know in a general way who makes that class of goods. That knowledge is important, but the merchant will be better equipped if he can tell quickly where to get the style that is wanted. For instance, if the customer specifies the New Idea, it will be found by consulting the book, as in the illustration, that it is made by the Stover Mfg. Company, Freeport, Ill. If, however, the customer asks for a non-hold back Hinge, without stating any choice as to make, the same page indicates that a Hinge of that description, known as the Olympic, is made by the Clark Mfg. Company, Buffalo, N. Y.

An Impatient Customer.

For lack of a system of some kind much valuable time is often spent in looking over catalogues before just the right thing is found; and, indeed, many times the search is abandoned without finding it, while the customer waits with growing impatience and is finally informed that "I know just what you want and will order it for you." Meanwhile the customer gets the impression, and not without reason, that the buyer or clerk is not as well informed as he should be. Such an impression naturally reflects upon the store. Who will blame him if he finds his way to the store of a competitor in hope of better results? If he is successful the merchant cannot tell how much more of his patronage may go to the same place.

Superior Service.

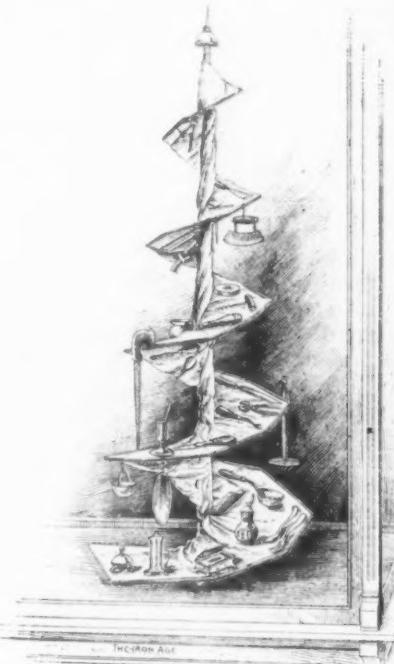
Perhaps the competitor is not any better equipped in this respect; but even if not, would it not be better, instead of giving the customer any reason for discontent, to see to it that the dealer's service is so superior as to give him pleasure in doing business with the well informed man, and thus make him loth to trade elsewhere?

Making a Start.

To carry out the system will require time, but that may be done in odd moments, and the time will be much more than compensated for by the great saving of time, not only the dealer's, but that of customers, which from their standpoint is more important. The material may be gathered from catalogues, bill heads, invoices, advertisements, notices of new goods, &c. The magazines should also be watched for advertisements which interest the house furnishing trade. The demand for some goods may sometimes be traced to them.

A WINDOW DISPLAY STAND.

In the store window of the Hull Bros. Company, Danbury, Conn., goods were exhibited some time ago on a revolving helical display stand, shown in the accompanying illustration. This was made of a 3 x 3 upright,



A Window Display Stand.

10 feet high. Into this $\frac{1}{2}$ -inch holes were bored 3 inches apart, each of the holes being turned 45 degrees to the right of the one below it. Into these holes round rods were placed, the lowest rod projecting 40 inches from the center of the 3 x 3 upright. Each of the other rods was 1 inch shorter than the one below it. In that way the frame for the screw was built up. A $\frac{1}{2}$ -inch rope was then taken and fastened to the ends of these spokes, thus forming the outside of the screw. The whole was then covered with white cheese cloth. Then some red cheese cloth was taken and put around the outside edge, over the rope and adding color to the effect. The stand was placed in the show window and fastened to a turntable in position there, which was slowly revolved by a small water motor. Small articles, such as Tools, Kitchen Utensils, Novelties, &c., were placed on the stand, as shown. This display proved to be a very attractive one and was generally appreciated.

L. J. Zinner has sold his Hardware business in Altoona, Iowa, to Mason & Porter Bros. The new firm are intending soon to erect a new two-story building.

Joseph Karl has disposed of his Hardware business at New Prague, Minn., to Adolph Sachs and A. J. Rynda, who will continue under the style of Sachs & Rynda.

THE TRAVELING SALESMAN HIS METHODS AND CONTROL

BY SAMUEL MASTERS.

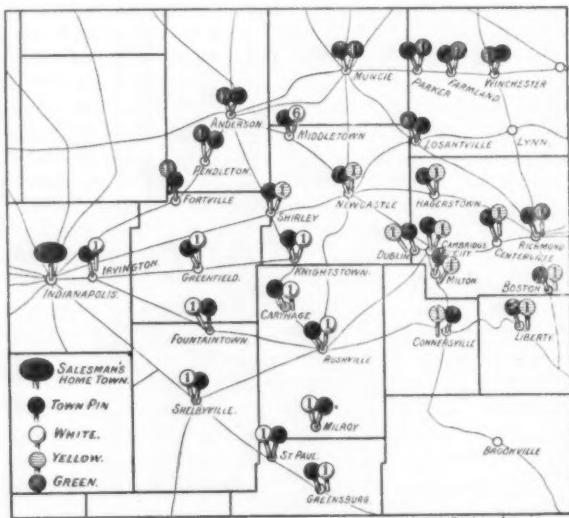
CHAPTER IX.—Pinning the Maps.

ND now, with six months' reports in hand, and with his lists of accredited dealers in his salesmen's possession the jobber has his routing work well in hand. He has a record of the towns claimed by each of his men, and has given them all possible information regarding credits so that both he and his men have a clear understanding of the territory reserved to each and its capabilities. Now comes the effective work of the system outlined.*

Map Record of Movements.

The accompanying diagram illustrates a route such as might be covered by a man living in Indianapolis and traveling for a jobber in any of the surrounding jobbing points—Chicago, St. Louis, Toledo, Cincinnati, Columbus, Cleveland, Detroit—or Indianapolis, though an Indianapolis or a Cincinnati jobber could doubtless add many of the smaller towns to advantage, and by cutting off a portion of the territory here indicated work a smaller section more closely and visit the towns more frequently.

This specimen route is intended to be covered every thirty days. No town which it is worth while to visit it



Route Map.

all for orders in general Hardware should be left unvisited for a longer period than this. Many of the jobbers are reducing this limit materially, at least one of the prominent jobbers on the Pacific Coast putting his entire territory on a ten-day basis. If the trade on the Coast, with its comparatively limited competition and long distances between cities, can be worked to greatest advantage in this way, it surely can be done in the more thickly settled sections where jobbers' salesmen tread on each other's heels and the orders are given to any one of a dozen firms whose salesman is first to call. However, the old limit and the one most generally employed is thirty days, and hence this route is laid out upon that basis.

Dating Pins

In addition to the colored pins representing the salesmen, one of which is placed at each town he visits, the model outfit contains pins by the use of which the salesman's last call at any given town may be known at once. These pins are like the others, except that they have a letter or numeral stamped upon the top for distinguishing the different months, as follows:

- | | | |
|--------------|------------|---------------|
| 1. January. | 5. May. | A. September. |
| 2. February. | 6. June. | B. October. |
| 3. March. | 7. July. | C. November. |
| 4. April. | 8. August. | D. December. |

* The system described by Mr. Masters is substantially that of Rand, McNally & Co., Chicago and New York, who furnish outfit in a variety of forms with pins, maps, colored headed tacks, cabinets, &c.

The numeral is not used for the last four months as there is not sufficient space upon the top of the pin for two figures.

In addition to the numeral signifying the month the pins are of different colors to represent the portion of the month, white, for instance, indicating the first ten days, yellow the second ten days, green the remainder of the month, from eight to eleven days. Thus a white "1" pin beside a town pin would indicate that the salesman had called there in the first ten days of January; a yellow "7" pin, the middle portion of July; a green "B" pin, the latter portion of October.

On a thirty day route it is not absolutely necessary to use the ten day divisions, the month in which the last call was made being sufficient. On ten-day routes it is advisable to use the three colors, as if towns are omitted upon any circuit of the territory the fact is known.

Following the Salesmen's Movements.

Even on the thirty-day route it is at times of advantage to use these ten-day divisions, as they enable the routing clerk to follow the salesman over his route. In the specimen shown, it is easy to follow the salesman from the time of his being at Shelbyville until he has covered his route—Shelbyville, St. Paul, Greensburg, Milroy, Rushville, Fountaintown, Irvinton, Greenfield, Knightstown, Carthage, Shirley, Newcastle, Hagers-town, Cambridge City, Dublin, Milton, Connorsville, Liberty, Boston, Centerville, Richmond, Losantville, Muncie, Winchester, Farmland, Parker, Anderson, Pendleton, and Fortville. It may be explained that this route is pinned simply as a specimen, and the local time tables might make it more advantageous to cover the route in a different order.

This is a net route, with all towns not covered placed upon other routes with the exception of Middletown, which the dating pin tells us has not been visited since early in June. The field record of visits made may give a good reason for omitting the town; if not, he should be asked to give one, or to go there regularly.

Territory Claimed and Territory Covered.

The first time the field records are transferred to the map, if there has been no previous pinning of routes, it will be seen that a goodly number of towns accredited to the different salesmen are really unoccupied. This is particularly true of the older routes in which the salesmen have grown satisfied to follow a settled routine, dropping off towns not easy to reach and confining themselves to a list of regular customers on the main lines of travel. In one instance a salesman who had been given a route at the time his house had but ten men out and territory was allotted freely, had the central portion of Indiana for his field, and pinning his route in the fashion shown, proved that there was room for two additional salesmen in his territory without depriving him of a single town he visited. In another, it was developed that a line of county seats extending half way across a State on the same railroad had not been visited for two years, and when the salesman was required to visit them, dropping an equal number of towns at one side of his territory it was possible to add another profitable route to the jobber's list.

Getting on a New Basis

When the route is pinned for the first time a list is made of the towns upon the route which have not been covered for six months and the salesman is asked to either release them or to cover them. Some he will give up, and beside the salesman's pin is placed another signifying that the town is unoccupied. If, as in the case of Middletown, the town can be best covered by this salesman an effort is made to induce him to go there again. If it is an outlying town which can be covered to advantage by another salesman, or can be added to a new route he is informed that as he has dropped the town it has been transferred to a neighboring route.

Thirty Towns in Thirty Days.

A route the size of the one shown will give ample work for a salesman. A territory containing thirty towns with more than 700 inhabitants will give a man all the work he wants in thirty days. If he has any spare time he can use it to advantage in his home town. He should be able, as many salesmen are, to look after

the trade in his home town so carefully as to find orders waiting for him every Saturday, when he reaches home. Besides, there are in most instances smaller towns which it will pay to visit, and where goods can often be sold at a better profit than in the larger places which are more frequently visited.

Never Take a Town from a Salesman.

In making a re-division of territory, the jobber should take no town from a salesman. If he covers it, it belongs to him. If he does not, and does not care to do so, he will voluntarily give it up if he is told that his only right to it lies in his visits to it and the resultant trade. If the jobber is careful to leave him in possession of the towns he actually visits he will be the more willing to give up the others.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE,
NORFOLK STREET, LONDON, W. C.

BUSINESS is better and manufacturers are expressing themselves as more hopeful. As a Sheffield manufacturer remarked: "You may have to put on a pair of spectacles to see it, but an improvement is going on, and that a more cheerful feeling prevails I have no doubt at all." An indication of this is to be found in the fact that Sheffield manufacturers of Saws, Tools, parts of Agricultural Machinery and similar goods are placing contracts for material more freely. This surely means that more active business is in sight. More inquiries for quotations have also come to hand during the week, so that for a little space our anxieties have been allayed. The good weather is doubtless accountable for the increased number of orders for Cultivating and Edged Tools, Garden Furniture and Irrigating Appliances, Hose Fittings, Syringes and Watering Cans. Then again spring cleaning is in sight (or this weather at least reminds one of it) and accordingly we have increased inquiry for tubular brass work, such as Curtain, Stair and Picture Rods, Cornice Poles and Rings. The makers of Japan Traveling Trunks and Hat and Bonnet Boxes are also busy. Cart and Carriage Lamps and Fittings, Springs, Axles and Under Frames are in good request, particularly for export to South Africa and India. There is an improvement in the demand for Builders' Ironmongery, and notwithstanding the depression in the shipping trade, a fair weight of shipping Ironmongery has left Wolverhampton. Large orders have been received by the Galvanized Iron makers. Fencing and Iron Hurdles and Nuts and Bolts are both active, while the Cycle and Motor Car trades are taking on additional workmen.

Condition of Trade Abroad.

On overseas account the exceptional harvest in Argentina is favorably affecting our trade with Buenos Ayres. Practically nothing has been felt of the Venezuelan blockade, as British Hardware exporters are not much concerned with it. Brazilian business expands a little, special lines such as Machetes and Tin Cups for collecting rubber juice being exported in good numbers, the latter in particular, which are going out in thousands of grosses. We have been doing slightly better in the Far East, not only in India and the Straits, but in China and Japan, though fresh risings in the former country are momentarily checking business there. British makers are confidently expecting good orders from the Central American States, particularly Colombia, when the Panama Canal works are taken over by the United States. Of course, the bulk of this business will fall to the share of American contractors. In any event Hardware and Metal manufacturers are doing good trade with Cuba and Mexico, particularly in Tools, Galvanized Sheets, Gas Fittings, Electro Plated and Stamped Hollow Ware. Good orders have come from South Africa, India, Canada and the United States. Merchants trading with Europe report unfavorably. Germany is not taking anything like its customary quantity of British goods, and the demand both from France and Russia is distinctly languid. There has been more animation in some of the markets of Southern Europe, but the Mediterranean trade as a whole is adversely affected by passing stringency in Turkey and the disturbed state of Morocco.

So far as bulk is concerned we still maintain our output of Nuts and Bolts, and there is a better demand for Builders' Ironmongery. Makers of Iron Fencing are busy, and there is a good demand for Plantation Hoes and Horticultural Implements. Contracts for Tyres, Axles, Buffers and other railway material are unevenly distributed. The home railway companies continue to place orders very sparingly, and nothing beyond what is necessary to meet current requirements. For railway material the best orders recently have come from India, South Africa and South America. The makers of both light and heavy railway materials are now so well organized that a constant succession of heavy orders is imperative to keep the works going. A feature of the trade not to be overlooked is that during the week heavy speculative buying has taken place in the Copper trade.

There seems to be an increasing scarcity and dearness of many of the natural products used in the hafting of Cutlery. How manufacturers would now do without imitations of all kinds it is impossible to say. Pearl shells have reached such a price as to make it difficult for cutters to realize a fair profit. This is largely owing to the free and apparently unlimited buying on behalf of America. For some kinds of shells they seem prepared to pay any price if they can only secure them. But a moderate business is going on with Germany, as the Cutlery branches there remain depressed. At the recent sales of stag horns in London the supplies were only moderate, and prices were firm. Brokers expressed the opinion that best horns would become increasingly scarce, as owing to the advance in civilization there are not the areas over which to gather them that there were in the past. Very high figures are also being paid for buffalo horns, as large numbers of them are being stripped and used, where formerly resort was had to whalebone. It is declared to be a good substitute.

The state of trade can be judged by official reports from districts specially identified with Hardware, Cutlery and the miscellaneous metal trades. In the Black Country employment in the Hardware trades is reported as not satisfactory, but there are said to be signs of improvement. Employment is very fair on goods for the Australian and African markets, such as Iron Buildings, Water Tanks, Roofing, Fencing and Galvanized Articles. In the light trades employment generally is quiet. It is slack in the Chain, Anchor, Vise, Edge Tool and Iron Plate trades.

The Birmingham Market.

At Birmingham employment in the metal trades generally is quiet. With kitchen range makers, bedstead workers, hollow ware and tube makers, pen and pin makers it is fair. In the brass trades it is fair generally, but with makers of fenders and fire brasses it is quiet. Employment is quiet with silversmiths electroplaters and jewelers; good with Britannia metal workers. At West Bromwich employment is fair with spring makers and nut and bolt makers. Employment is good in the watch trade at Coventry, and in the needle and fishhook trade at Redditch, where, however, it is quiet in the fancy case making trade.

In the Sheffield district employment is moderate with stove grate workers, edge tool grinders, file cutters and forgers, and in the pen and pocket knife and razor trades. It is quiet with file grinders and haft and scale pressers. In the table knife and saw trades it is slack. Employment is slack in the silver and plate trades.

At Rotherham brass workers are fairly well employed.

In London employment is slack with tin, iron plate, sheet metal, zinc, wire and brass workers, very quiet with farriers. In the silver and electroplate trades it is quiet, with goldsmiths and jewelers it is bad. Short time is being worked in nearly all these trades and in most employment is reported as worse than a month or a year ago.

Employment is reported as good with wire drawers at Warrington, as moderate with sheet metal workers at Manchester, and with wire, tin, zinc and stove workers at Oldham. With pipe molders at Ilkeston it is fair. In Edinburgh and Leith it is good with tinsmiths, at Falkirk it is fair with range and stove makers.

Machine tool makers are busy on rifle making machinery, and there is a steady demand for capstan and

other lathes and profiling machines. London, Lancashire and Scotland have sent improved orders for Metallic Bedsteads, but in the Bedstead export department the trade is meager, Australia, Canada and South Africa being the chief buyers. Gas Fittings are in request for several markets, home and foreign, but business is slack in Lamps, except for cycle, ship and carriage use.

Our Trade with Canada.

The High Commissioner of Canada has just given out a statement containing many interesting figures, in which he seeks to prove the accuracy of the conclusions relating to the British preferential tariff of Canada, which the Canadian Ministers submitted at the recent Colonial conference. *a.* That the preference is a very substantial and genuine one; *b*, that it gives British merchants a material advantage over foreign competitors in the Canadian markets; *c*, that the preferential rates are not too high to shut out reasonable competition with the Canadian producer; *d*, that the preference has resulted not only in arresting the continuous decline in British trade with Canada, but in stimulating the trade; if it had not been granted it is not very likely that the volume of British imports into Canada would be as large as it is to-day, to say the least; and *e*, that the advantage given by Canada to the British manufacturer is proved beyond all question. The High Commissioner quotes figures showing the exports of Great Britain to Canada between 1887 and 1897—that is, prior to the adoption of the preference—and shows that trade steadily declined in that period. The figures as given by the High Commissioner are as follows:

Year.	Dutiable.	Duty free.	Total.
1887.....	\$35,766,273	\$9,195,960	\$44,962,233
1890.....	33,267,721	10,122,520	43,390,241
1893.....	31,869,267	11,279,146	43,148,413
1897.....	20,217,422	9,194,766	29,412,188

The reciprocal tariff as it was at first described came into operation on April 27, 1897—that is, in the last two months of the fiscal year ending June 30, 1897. It was 12½ per cent. lower than the general tariff. The preferential tariff of 25 per cent. in favor of British goods was enforced from August 1, 1898, until July 1, 1900, when the preference was increased to 33 1-3 per cent. The following table of exports of the United Kingdom to Canada since 1897 indicates a steady and substantial expansion in the trade, which it is claimed by the High Commissioner is largely the outcome of a preferential tariff:

Year.	Dutiable.	Duty free.	Total.
1897.....	\$20,217,422	\$9,194,766	\$29,412,188
1898.....	22,556,479	9,944,438	32,500,917
1899.....	27,521,508	9,538,615	37,060,123
1900.....	31,561,756	13,227,974	44,789,730
1901.....	31,701,654	11,316,510	43,018,164
1902.....	35,062,564	14,143,498	49,206,062

But an analysis of the statistics for 1901, taken from the statistical year book of Canada, must make British exporters furious when they see a comparison between the trade done by the United States with Canada and that done by Great Britain. The totals are as follows:

	Dutiable.	Free.	Total.
United States.....	\$53,600,278	\$56,884,730	\$110,485,008
Great Britain.....	31,701,654	11,316,510	43,018,164

Among the goods sold by the United States to Canada in larger quantities than those coming from Great Britain, I observe Bicycles and Tricycles, Brass Manufacturers, Brushes, Copper Manufacturers, Cordage, Fertilizers, Furniture, Picture Frames, Glass, Gold and Silver Manufacturers, Iron and Steel Manufacturers, Metal Manufacturers generally, Musical Instruments, Paints and Colors, Tin and Tin Manufacturers, Trunks, Twines and Varnish. When one looks at these figures, the only conclusions, it seems to me, to be drawn are: 1, That the purchasing capacity of Canada has during the last few years increased by leaps and bounds; and, 2, notwithstanding the preferential tariff, the United States trade with Canada increases in greater ratio than does the British trade with Canada. My own observation in Canada a few years ago, when I traveled over specially to investigate this question, was that in many respects Great Britain could hold her trade east of Montreal, but that west of Montreal—that is, throughout the region which is fast developing—Americans are likely more and

more to be masters of the situation. In this connection I read with interest that American capital is playing a great part in the development of the great Northwestern territory. I know as a matter of fact that Canadian statesmen regard this with considerable anxiety, and the most urgent steps are being taken in London by responsible Canadians to induce British enterprise in developing the region between Manitoba and Vancouver.

The Ivory Sales.

The London Ivory auction, which opened this week, did not disclose any good quality Ivory suitable for the Cutlery trades. Roughly estimated, West Coast African showed a firm tone and little irregularity, prices being in almost all instances fully those last realized to £1 per hundredweight advance. The East Indian and Zanzibar large soft tusks were about average. Little purchasing was done, however, on behalf of Sheffield, for the general reason that the Ivory was too soft, and more buyers are going over to Antwerp next week.

A Big Fire and Its Result.

We have all been saddened this week with a terrible holocaust of mentally defective women at the Colney Hatch Asylum. A wooden built annex to the main building was burnt down and 51 of the inmates were victims. One of the results from this fire has been inquiries into the system of Automatic Sprinklers. If any American house has a good Automatic Sprinkler, now is the time to let us know of it on this side of the water.

American Exporters Please Note.

In a letter to hand this morning, dealing with another subject, a progressive Hardware factor writes to me: "To speak frankly, I appear to have entirely lost interest in the American trade. I have spent a considerable amount in trying to come to terms with some American companies, but up to the present without any result. I thank you for the interest you have taken with me, and possibly when the Americans are not so busy and more anxious to get a foothold here, they may be more reasonable to deal with." Personally, I cannot understand American houses treating possible future agents or possible future customers so curtly as is being done in certain quarters to-day. British buyers have shown me letters from American houses, which are glaringly lacking not only in average courtesy, but which show an unreasonable confidence that trade in America is going to be so good for ever and ever that there will be no need to cultivate any other market. It seems a pity that these gentlemen should so soon forget the lessons that stern facts taught them in the years 1893 to 1897. I would like to add that in the vast majority of cases British agents find American correspondents courteous and sympathetic. It is the small minority which does so much harm.

Points About the Gun Trade.

Judging by the annual report of the Webley & Scott Revolver & Arms Company, Limited, it would appear that the demand in this country for Revolvers is on the decline, but there is an improving request for sporting Guns. The chairman of this company says that skilled labor, such as is required in their works, has become costly and rare, and has to be supplemented by labor saving appliances which must be brought into play at the expense of revenue. An important development is the close relations which have been started with the well-known firm of Lebeau Courally, who has been described as the Purdy of Belgium. Of late years it is notorious that the Belgians have made rapid strides in the science of Gun making, and by this arrangement the Webley & Scott Company, of course, benefit by any improvements which may take place in the Belgian Gun trade. If these developments are possible to an English house, there seems no reason why an American firm should not equally follow suit and establish connections on the same lines.

Sanitary Appliances for South Africa.

Considerable orders from South Africa are coming to hand for sanitary appliances. In many instances the materials are of a type expressly designed for farm use, and there seems no doubt but that the Boer population have been affected in their notions of domestic

economy by their contact with English habits during the last few years. Importers are well content with the patterns produced in British factories, and Continental imitations are meeting with little or no demand. In some instances contracts taken by Hamburg travelers in competition with representatives of British firms are being placed in this country. The new townships are being erected upon permanent lines, and the makeshift shanties which gave a distinct *cachet* to the early gold-seeking settlements in other continents half a century ago find no successors on the Rand. When the railway rates have been adjusted, and the shipping ring has learned wisdom, the development of building in the new colonies will be swift and on a large scale.

The Blue Nile as a Trade Route.

Importance is attached to an expedition which has been organized under W. N. McMillan, with the object of testing the navigability of the Blue Nile between Abyssinia and Khartoum. It is thought that this waterway may prove of the very greatest value from the Anglo-Abyssinian commercial standpoint. At present the bulk of the Abyssinian trade goes to the coast at Jibouti, the sea terminus of the French railway. Most of this traffic would be diverted to Khartoum and Cairo should the Blue Nile prove navigable. The discoveries of this expedition are worth watching.

South African Freights.

The agitation against the South African shipping ring is bearing fruit in the shape of reduction of the freight tariff to ports east of Cape Town. It amounts to 15 shillings per ton to Algoa Bay on one-fifth of all the cargo, and proportionate reductions are to be made to the other ports north of Port Elizabeth. The reductions come into force at once. Meantime, however, the Houston line is busy, and I presume the law case will be proceeded with.

Moving to the Seaboard.

I have already reported various cases of large Midland manufacturers who are moving to the seaboard to avoid excessive inland railway freights on foreign sales. Among these is the firm of J. Lysaght, Limited, who removed a portion of their establishment to Newport, South Wales, some time ago. The result appears to have been in every way satisfactory, for there are now indications that the remaining part of the works will be closed within a short time. Last Saturday a notice was posted at the company's Swan Garden Works, to the effect that the men were about to be given 14 days' notice, except those employed in the pot and foundry departments.

AUSTRALIAN NOTES.

FROM A SPECIAL CORRESPONDENT.

THE month of January proved very quiet for wholesale and retail trade alike. Country trade continues decidedly poor, and speculation is absolutely dead. Cable advices will doubtless have told you of the application for the appointment of a local receiver and manager for the firm of Jas. McEwan & Co., Limited, of Melbourne. The affairs of this company and their next door neighbor in Melbourne (McLean Bros. & Rigg, Limited) have been the subject of much comment in London and other financial centers for years past. Apropos of the last named firm, they have abandoned the retail branch of their business in Sydney and sold their stock to F. Lassetter & Co. of that city, a firm who appear to have made wonderful progress during the past ten years, on the "universal providing" lines. The Implement and Heavy Hardware business of McLean Bros. & Rigg, at Sydney, is still to be carried on.

Customs Decisions.

American manufacturers will please note that billheads and invoice forms bearing only the Australian address of their agents are dutiable as manufactured stationery, 25 per cent., so it will be cheaper for agents to do their own printing after this.

Other decisions affecting American exports to Australia are: Garden Tools, in sets, for ladies' or children's use, 12½ per cent. Oil and gas engines for motor cars, 20 per cent. Rings or ornaments used in the manufacture of bedsteads, 20 per cent.

Sydney Harbor Bridge.

The Sydney Harbor Bridge is still a visionary project and amended tenders are being asked from three of the lowest former tenderers. But for the fact of not leaving any stone unturned in order to secure additional business, American engineers would do well to largely ignore Australian Government contracts. (Only by doing so the British or German might get it.) The suggestion is called forth by the growing tendency to receive plans and prices, reject them all, allow the local engineer to use the plans and estimates and then proceed with the work. A flagrant case of this nature happened quite recently. Some guarantee should be given that in any contract called for, especially of so important a nature as bridge building—the work shall be proceeded with inside some specified time. This would allay any suspicion a firm might have that they were wasting their own and their draftsman's time in preparing estimates.

Meantime, the Sydney Bridge, like the Transcontinental Railway and the Federal Capital, can, and most likely will, be indefinitely shelved.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

The business of the Gillette Hardware Company, Sioux City, Iowa, has been purchased by James G. Singer and G. E. Lawson of Chicago, who will conduct a general retail Hardware business, carrying a complete line of Hardware and Stoves. The business is incorporated and the capital stock has been increased from \$10,000 to \$15,000, all paid. Jas. G. Singer will be president and G. E. Lawson secretary and treasurer of the company. Mr. Singer entered the Hardware business as a clerk with Keene Bros. Hardware Company, Chicago, and later was employed by the Chicago office of the Reading Hardware Company, with whom he was connected for over eight years. He is an experienced Builders' Hardwareman. G. E. Lawson was identified for 16 years with the Fuller-Warren Company of Milwaukee, and in 1900 left them to manufacture Spring Hinges, the style of the company being the Lawson Mfg. Company, located in Chicago, with branch office in New York City. The Gillette Hardware Company request catalogues, price-lists, &c., covering the general Hardware line, as well as Stoves, Furnaces, &c.

Charles E. Little, who for 30 years was at 59 Fulton street, New York, dealing in Hardware, Tools and Machinery, succeeding his father, Charles S. Little, who established the business in 1837, is now located at 92 Wall street, as general broker and commission merchant, handling Machinery, Hardware, Cutlery, Tools, &c. He is desirous of receiving catalogues and prices concerning this character of goods for both export and domestic trade. He is making a specialty of the export business.

W. H. Haney, dealer in Hardware, Stoves, Tinware, Farm Implements, Seeds, &c., Claremont, Va., has lately completed a new building, to which the business has been moved. The new establishment is an attractive one, and admirably adapted to the requirements of the modern Hardware store. Mr. Haney has put in new filing cabinets for taking care of catalogues, price-lists, &c., and will be glad to receive matter of this sort from manufacturers in the above lines. He also desires to hear from makers of store fixtures.

Montana Hardware Company, Butte, Mont., have recently moved into their new quarters in the new Pennsylvania Building, where they have materially increased facilities. The size of the premises is indicated in the fact that the main show room is 212 x 60 feet. They are intending to branch out more extensively into the jobbing business, and request catalogues from manufacturers of Shelf and Heavy Hardware, Mining and Mill Supplies, House Furnishing Goods, Glassware and Crockery.

WRIGHT WIRE COMPANY.

THE WRIGHT & COLTON WIRE CLOTH COMPANY, Worcester, Mass., have changed their name to the Wright Wire Company to better indicate the nature of their business and for the sake of brevity. The name of Colton disappeared from the business several years ago, when Samuel H. Colton, one of the organizers of the company, retired. When the business came to Worcester, Mass., 13 years ago, and incorporated, Mr. Colton was one of the organizers and consequently his name was coupled with that of the Wrights in its name. George F. Wright, who had been for years the mechanical engineer of the Clinton Wire Cloth Company, of Clinton, Mass., with his two sons, George M. Wright and Herbert N. Wright, had established the industry four years previously. They still continue their interest in the business and in the active management. The board of directors has been enlarged by the addition of O. W. Norcross, president of the Norcross Bros. Company, Henry C. Graton, treasurer of the Graton & Knight Mfg. Company; George T. Dewey, formerly a director of the Washburn & Moen Mfg. Company, and Rufus B. Fowler, all of Worcester. George F. Wright is the president, George M. Wright the vice president and general manager, and Herbert N. Wright, assistant treasurer and clerk. The principal product of the company when the business was established nearly 18 years ago was wire cloth. But the business has so enlarged and its products have become so diversified, that the old name became misleading. The Wright Wire Company now manufacture all kinds of Wire, Wire Drawing and Wire Working Machinery, as well as the general products of Wire, including Wire Rope, Poultry Netting, Fencing, and Wire Cloth of many varieties and for numberless purposes; Wire Clothes Lines, Wire Staples, Double-pointed Tacks and many other varieties of Wire Goods. The new branch of the company's business, the manufacture of Wire Rope of all kinds, is located at Palmer, Mass., where are also located the principal wire mills of the company. Alfred Waites and James B. Stone, who were for a long time in charge of the manufacture and sale of Wire Rope for the Washburn & Moen Mfg. Company, will have the management of this new department. To permit these extensions the corporation materially increased its capital stock last year.

COES WRENCH COMPANY'S FIRE.

THE COES WRENCH COMPANY sustained a loss of more than \$30,000 by a fire which occurred early Tuesday morning, March 3. More than one-half of the building utilized for the Machine Knife department was destroyed with a large amount of stock in various processes of manufacture. As the company's books are filled with orders in this department as well as in their Wrench department, the most regrettable part of the fire is the loss in business at this time. Work will be rushed in rebuilding and re-equipping the shop, and the contractors promise to have the building done in 18 days, the attempt being made to accomplish a building record. The burned building is an old one. The loss is fully covered by insurance.

Glover & Ferrin, Hardware merchants, Mt. Clemens, Mich., have dissolved partnership. Charles S. Ferrin has purchased the interest of Minnie G. Glover, and will continue the business under his own name.

Andrew Noll, Chilton, Wis., has disposed of his stock of Hardware to the new firm of Noll & Co., comprising Jacob Noll, Anton Egerer and Ed. Plank. All of these parties have been identified with the business for a number of years.

Wiles & Winter Hardware Company, Cherokee, Kan., have been succeeded by Wiles Hardware Company. This is a change in name only, and does not affect the capital or business in any way.

Albert Dudek has sold his Hardware business in Littleton, Col., to J. H. Goddard.

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GEORGE J. LAIGHTON.

THE retirement of George J. Laighton from the presidency of the Russell & Erwin Mfg. Company, with whom he had been connected 40 years, was recently made the occasion of a presentation in the form of a beautiful sterling silver loving cup of generous proportions, the gift of the selling staff, in token of the esteem and appreciation in which the recipient was held as an executive and associate.

The presentation was made in the company's office in New York in the presence of the donors, through their



GEORGE J. LAIGHTON.

representative and spokesman, Benjamin A. Hawley, and was intended to symbolize in a specific way their regard for their late chief's nobility of character, high integrity and many sterling qualities, and attractive personal traits. In connection with the regard and esteem thus evidenced by Mr. Laighton's immediate associates in the company, his many personal and business friends will most heartily unite in congratulations on the merited success he has achieved and the comparative leisure he is permitted to enjoy.

Some reference to Mr. Laighton's long service and honorable career with the company, embracing, as it does, the period of their greatest progress, their first factory having been erected in New Britain, Conn., in 1836, may be of general interest.

George J. Laighton was born in Portsmouth, N. H., and after spending two years in a retail Hardware store in his native town, determined to leave home and seek his fortune in New York.

His purpose was to obtain employment with the Russell & Erwin Mfg. Company, and, arrived in the city with a note of introduction from his former employer, presented himself to his hoped for employers, by whom he was told there was no existing vacancy. The following six weeks were spent seeking employment in the wholesale Hardware stores of New York. Finally, discouraged at want of success, and just before leaving for Philadelphia, where he planned to go to sea before the mast, he made a final call on Russell & Erwin, then located at 87-89 Beekman street and 53-55 Cliff street, and was hired as a clerk.

Isaac D. Russell was then in charge of the New York warehouse, A. W. North was credit man, J. B. Ogden manager of the sales and Mortimer C. Ogden, buyer. Young Laighton was assigned to the office staff, and his first duty was to assist R. R. Williams, now Hardware editor of *The Iron Age*, in making up an account sales of a certain class of goods sold in Canada. These duties did not occupy all his time and, wandering through the building one day his attention was attracted to the slovenly condition of the stock on the fifth floor. He

asked and was granted permission to put this stock in order, with the result that M. C. Ogden subsequently asked him to similarly reorganize the fourth floor stock. Before this work was accomplished the boy was taken sick, and replying to a question concerning his absence, he was obliged to say he was starving from lack of sufficient food, which his salary of \$3 per week, \$2.50 of which went for board, would not pay for, the remainder being too little for ferriages and luncheons. When he reached New York his cash capital was but \$14, and in the interval of six weeks before securing work most of that was spent. On his statement of the case Mr. North introduced him at the Belmont Hotel, in Fulton street, which at that time was serving a good lunch at a shilling (12½ cents) a plate, telling the management that the company would pay that much per week to supply the lad's wants.

It may be that this incident directed the attention of the managers in New York to the young clerk; at any rate the manager of the California department, which was just then in process of organization, asked for his assignment to that department, he thus becoming one of the new staff. In July of the same year he was told that his services had been satisfactory, his wages at the same time being raised to \$10 per week. Mr. Laighton recalls with great satisfaction that within the year he had saved \$50, which he invested in a United States gold bond, then issued in low denominations. From clerk he became buyer and then manager of the California department, to which the company shipped as much as \$700,000 worth of merchandise in a single year before that branch was abolished.

Mr. Laighton was elected a director of the company January 28, 1891, assistant treasurer February 15, 1893,



Loving Cup Presented to George J. Laighton.

treasurer February 27, 1895, vice-president February 19, 1896, and president January 28, 1898.

The period covered by Mr. Laighton's connection with the company shows great changes in the methods of doing business, as well as the variety of goods dealt in and the volume of sales. At the beginning of his employment with the company, with the bulk of Hardware made abroad, there were many large importing and jobbing houses, where now there are but few of either class. Then and for some years after Mr. Laighton's beginning buyers from the Eastern, Western and Southern States made regular visits to the New York market, covering a period of about six weeks in January and Feb-

ruary and July and August of each year. Now when merchants visit New York they are usually on pleasure bent or en route to Europe, and the call is a social one. Forty years ago Russell & Erwin had but two traveling salesmen.

Russell & Erwin Mfg. Company came to New York as distributors of their own goods, but finding they were not met half way by the jobbers, they were compelled in self defence to take on other lines than their own manufacture in order to reduce the proportion of general expenses. In this way they became jobbers of other makers of goods as well as sellers of their own manufactures.

From the corner of Beekman and Cliff streets, to which they had moved from a much smaller store on Cliff street nearer John street, they went to 45-47 Chambers street in 1868, occupying the whole store, which extends through the block to Reade street. In 1883 they bought the adjoining building on the east, No. 43, which increased their capacity one-half. During this period the company began the manufacture of Screws, steadily increasing the variety of General and Builders' Hardware made by them.

KEUFFEL & ESSER COMPANY'S MANUFACTURING PLANT.

KEUFFEL & ESSER COMPANY, 127 Fulton street, New York, with Chicago, St. Louis and San Francisco branches, are manufacturers and importers of Drawing Materials and Surveying Instruments, as well as many instruments of precision varied in character, the manufacturing or more important part of their business having been established in this country 36 years ago. Their brick factory at Hoboken, N. J., has been enlarged at intervals, as occasion demanded, until now the four-story building, together with additional land recently acquired, covers 33 city lots, or only three less than the equivalent of a city block, 200 x 400 feet. The first of the present buildings was erected in 1880, 30 x 100 feet, three stories high, to which, in 1885, more stories were added, after the completion, in 1884, of a large L-shaped building, which added 110 feet to the Third street front. In 1900 the buildings on Third and Grand streets were added, one of them 35 x 60 feet, the other 40 x 115 feet, both four stories high. Since then the company have acquired a large additional site crossing Grand street. There are now several large buildings on the property, to which some of the departments will be transferred to gain room in the present factories, and until more modern buildings can be built.

The main building contains the offices, drafting rooms, storerooms for materials and supplies, the loft for preparing paper for photo printing, with its huge coating machines, a well appointed chemical laboratory for making inks, &c., and large lofts for mounting paper on muslin. The upper part is devoted to the manufacture of Steel and Woven Measuring Tapes. All parts that go to make a Tape are made or graduated and the Tapes are tested in this building. The electroplating room is also located here. The Tape department, although only a part of the general factory, is said to be one of the largest in existence. In this building is also the mammoth press for printing profile and cross section papers and cloths in continuous rolls. The precision required for this work necessitates a very heavy and solid press, which occupies a room 40 x 60 feet. In one of the buildings are machines for circle and line dividing, the product of which is of superior excellence and precision. The special engines for dividing Logarithmic Slide Rules are also of the company's own design and are believed to be the only ones in America. This building also contains the assembling and adjusting rooms for Surveying Instruments, the latter provided with an abutting tower affording an unobstructed view in four directions for testing many of the instruments.

The large building on Grand street contains the tool and machine rooms, crowded with precision lathes, planers of various sizes, milling and screw cutting machines, presses, shapers, &c., of every description to meet the many requirements of the various lines of goods and adapted to turning out anything from a bulky

machine to the most delicate surveying or testing instrument. Here are made Levels, Transits, Sextants, Compasses, Anemometers and similar goods. Everything is made on the premises and finished there from casting to adjustment. Marine Compasses and Binoculars, many of which are in use in the United States Navy, are also made in this building. The motive power is almost altogether electricity, the several sections or departments of each floor having separate dynamos.

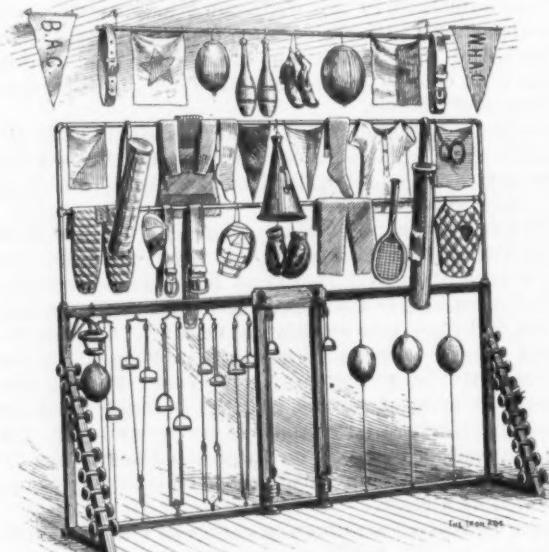
The wood working portion of the factory embraces everything in the line from a small triangle or curve to drawing tables 54 x 120 inches, and from a mahogany box for a 2-inch Compass to the largest size of chests for storing drawings. Most of these goods require mathematical correctness, such as Triangles, Spiral Curves, Railroad Curves, &c., and others, like Leveling Rods and Ranging Poles, require exact graduations. The hard rubber and celluloid tools are also made here, the latter forming a very considerable part of the output, continually increasing in extent and variety.

From the unique nature of their goods, Keuffel & Esser Company are compelled to design and make nearly all their own machines and tools and an important part of the factory is devoted to this purpose. Unusual regard has been paid to ventilation, the removal of floating dust, washing facilities and other improvements that tend to insure the best sanitary conditions. They have their own saw mill, kiln drying room and lumber shed on the premises. Much of the wood material, such as Rules, Scales, &c., is partially made and allowed to season for two years or so, so that when finally the graduations are cut each article is as accurate and free from error as it is possible to make it.

An adequate idea of the comprehensive line made in these factories can only be obtained from a perusal of their compact new catalogue of 504 pages, each 8 $\frac{1}{2}$ x 5 $\frac{1}{2}$ inches, just issued, in which is their full line, together with 26 full page illustrations from photographs of different parts of the factory and New York store, which will be sent gratis to those interested.

DISPLAYING SPORTING GOODS.

IN the Sporting Goods department of the D. B. Wilson Company, Waterbury, Conn., is a large rack, on which is made the elaborate display shown in the accompanying illustration. The lower part is built of 2 x 4 joists and the upper part of iron pipe which has been gilded. From the ceiling a piece of gilded pipe is



Displaying Sporting Goods.

also suspended from which are hung some of the articles in the display. It is said that having Punching Bags and Chest Weight Machines thus exhibited where they can be tried by the customers frequently makes sales. The display of the athletic clothing is frequently changed, but the flags of the local athletic clubs are usually kept as shown in the picture.

Pennsylvania Retail Hardware Dealers' Association.

CONCLUDING REPORT.

Manufacturers and Jobbers.

A NUMBER of manufacturers and jobbers were in attendance on the convention and especially at the open session, at which the subject of the relations between the different classes of trade was the principal topic. Among those thus present were the following:

Logan-Gregg Hardware Company, Pittsburgh, Pa.
 James C. Lindsay Hardware Company, Pittsburgh, Pa.
 Bindley Hardware Company, Pittsburgh, Pa.
 Prizer-Painter Stove & Heater Company, Pittsburgh, Pa.
 Pittsburgh Stove & Range Company, Pittsburgh, Pa.
 Peters Cartridge Company, Cincinnati, Ohio.
 Pittsburgh Plate Glass Company, Pittsburgh, Pa.
 Wilcox Mfg. Company, Aurora, Ill.
 E. C. Atkins & Co., Indianapolis, Ind.
 Yale & Towne Mfg. Company, Stamford, Conn.
 Keystone Steel Matting Company, Pittsburgh, Pa.
 New Jersey Wire Cloth Company, Trenton, N. J.
 H. Adler & Co., Pittsburgh, Pa.

Hardware manufacturers generally were not so fully represented by souvenirs at the convention as they have been at the meetings of the older associations in other



States. Tape lines were, however, given out by William K. Paff, representing the New Jersey Wire Cloth Company, and playing cards and a piece of music, by D. R. Branson, representing E. C. Atkins & Co.

Programme.

The official programme was a tastily printed pamphlet containing a good deal of information about the association, its membership, officers, &c., and concerning the National Retail Hardware Dealers' Association. Much credit is due to Secretary J. E. Digby for the preparation of the programme as well as for valuable service in making arrangements for the convention. The pamphlet contains a number of advertisements from jobbers and manufacturers, who thus evidenced their interest in the association, and the income from this source was sufficient to meet all the expenses.

Increase of Membership.

The desirability of increasing the membership of the association was considered, and after a careful discussion of the subject, it was decided to employ a canvasser for this purpose. In order to secure the necessary expense a number of the members of the association consented to guarantee a sufficient amount. It was the conviction of the members that if the matter is properly brought to the attention of the Hardware merchants throughout the State they will readily see the advantages

of the association and be ready to do their part in advancing its interests.

Syndicate Buying.

At the conclusion of the address made by T. James Fernley, in which expression was made of the interest taken by the jobbers in the welfare of the retail trade, one of the members inquired as to whether the action of the jobbers' association in requiring the syndicate buyers to remove the names of retail merchants from the list of their houses indicated a friendly disposition to the retail trade. Mr. Fernley in reply made the point that the removal of these names by the syndicate buyers was not demanded by the jobbers' association, but that the suggestion that there be a conference between the syndicate buyers and the representatives of the National Hardware Association came from the syndicate buyers. Mr. Fernley also expressed the view that syndicate buying in general not being within the reach of smaller retail Hardware merchants was not advantageous to the retail merchants as a class, and that the elimination of names of the larger retail houses from those served by the syndicate buyers was to the advantage of the great majority of the small houses, which constitute the principal part of the retail trade. While the subject was not carried further in open discussion there was more or less informal expression of opinion by the members in favor of syndicate buying in some form, possibly in connection with association work, as a means of enabling retail houses to purchase goods at prices which will permit them to meet the competition by which they are confronted. Several instances were referred to of successful syndicates of retail Hardware merchants, who in most cases purchased their goods directly and without the assistance of a New York buyer.

Committees.

The following committees were appointed by the president:

RESOLUTIONS: R. R. Williams, New York; J. M. Selheimer, Lewistown; Geo. V. Thompson, Mt. Jewett.
EXECUTIVE: J. W. Seaman, Washington; Geo. A. Bodine, Bradford; Geo. V. Thompson, Mt. Jewett; E. E. Lyons, Greensburgh; L. C. Fox, Irwin.
ARRANGEMENTS: James N. Kline, Williamsport; J. M. Selheimer, Lewistown; Geo. W. Hackett, Allegheny City.
NOMINATIONS: A. Q. Casselberry, Pittsburgh; A. M. Gregg, Monongahela City; G. W. Hackett, Allegheny City.
AUDITING: J. F. Frye, Charleroi; Charles H. Steele, Charleroi; P. J. Cover, Meyersdale.
TRANSPORTATION: C. H. Miller, Huntingdon; A. R. Smith, Kane; John W. Seaman, Washington.

Common Sense and Enthusiasm.

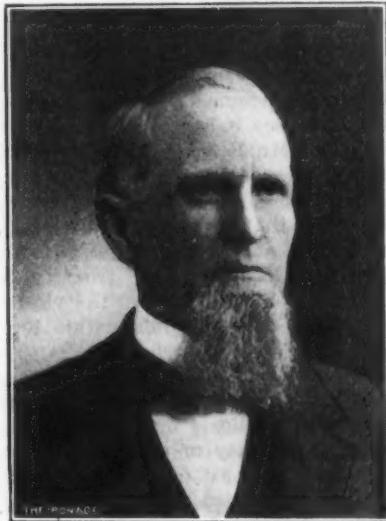
At Wednesday afternoon's session the following admirable address was made by James N. Kline of Williamsport:

My fellow toilers, I greet you; I salute you one and all; I care not what rating the commercial agencies give you, I am glad to be with you here. Alexander of Macedon has left a saying behind that has survived his conquests. This mighty sovereign, who had brought all the nations of the world to bow at his feet and wept because there were no other worlds to conquer, said "nothing is nobler than work," for work only can keep even kings respectable. Now, as we are all workers, that is why all of us appear here to-day in a respectable and proper meeting, to try and attain honorable and self respecting results. And we propose to do this in a spirit of fairness and with due consideration for the rights of others. True, we do not have Alexanders in these days, but we have Pierpont Morgans and several others, who bid fair to be the conquerors of the commercial world of our day. These conquerors sometimes keep us guessing as to what sudden changed conditions will come next, but we must face these conditions as we find them and endeavor to

Pennsylvania Hardware Association.

build so that our work may survive, for in this world it is the dead who govern as well as the living. The future is soon the present and the future soon the past. Martin Luther, George Washington and Abraham Lincoln speak to us from the past, and if we expect our work to endure we must endeavor to build not only for the present, but for the future as well.

Now I confess I am a novice in all that pertains to the creation, organization and workings of the Pennsylvania Retail Dealers' Hardware Association. And to be frank, I expect to be in this meeting nothing more than a looker



GEO. L. MOORE, President.

on in Vienna, for I am not in touch. My dear brother, who is in years my junior, was with you last year, and he, I am afraid, is responsible for my being here to-day. It seems that he promised some member that if he could get me interested I would come. Now it appears that he has succeeded in getting me interested to the extent of my being here.

A NEW EPOCH FOR DISTRIBUTERS.

I believe we are standing at the portals of a new cycle for the toiling distributors of the vast products of the great business concerns in the industrial world, consisting of what our English cousins would term the iron mongers. I believe that the chaos of a mighty force in the commercial world is rounding into form, and that we are beginning now to stake out claims that will yield and are preparing to work veins that hitherto have lain dormant, and which, if properly worked, will pay the retailer, the jobber, the manufacturer and the consumer as well. I believe that Pennsylvanians is now on the right road to accomplish in the way of organization that which the Hardware dealers of some of the younger States in the Union have accomplished years ago. I believe that we Pennsylvanians have been slow to act in so important a matter. Now, do we fully realize what it means to be a citizen of Pennsylvania and to take part in any kind of an organization that has emblazoned on its frontlet the name, "Pennsylvania?" I make this declaration. I love my country and am proud of my native State. Every child of Pennsylvania loves the grand old State. Her soil, her history and her name are sacred.

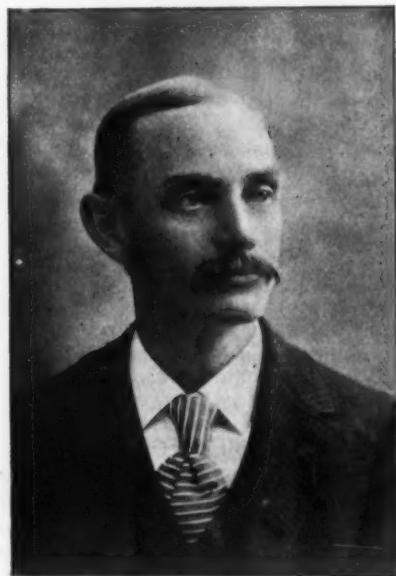
There never has been a time in the history of this giant republic (which to-day is the wonder and admiration of the world), from the day when those aristocratic gentlemen in powdered wigs and small clothes met in our own Quaker City and formulated and signed the most comprehensive political document that the world has ever known—there has never been a time but that Pennsylvania and Pennsylvania's sons have been at the head of the columns, be that time in war or in peace, in Church or in State, in organizations fraternal, social or commercial, but in formulating and putting in ex-

cution a retail Hardware organization Pennsylvania has been slow. However, the last year or two, thanks to the persistent efforts and the tender care of a faithful few, the seed planted bids fair to bring forth fruit.

SUPPORT THE ORGANIZATION.

The benefits to be derived from being a part of the State organization should stimulate in all a sense of pride and duty. The future of the organization depends largely upon the willingness of the members to devote some of their time, energy and money to advancing its interests and should appeal to every member. The officers and the Executive Committee say to the members, support us with your name, your influence and you will help yourselves in many ways. The highest and the lowest, the humblest dealer and the greater firm or corporation, wherever they may be in the retail Hardware dealers' class, will all receive benefits, provided, of course, that the association makes its declaration of principles of the proper tone, and so conducts its business meetings and its affairs generally by acting in a proper and dignified business manner that it may not be said of the association that while our logic is sound, our methods are bad. We all know that want of proper system and bad methods never bring the desired results. As I understand the proposition which calls us together, it is a fact that the several State associations have their own important work to do within their own organizations. This work is many sided and must be gone about with the firm determination to attempt only that which we all feel would be fair, just and right. A great writer has said "Opinions are but the form of cloud created by the prevailing currents of moral air; actions and words are carved upon eternity."

How can we best concentrate our opinions so as to get at the meat of the question and govern our actions in accordance with justice and equity? In the language of our statesman poet, Hon. John Hay, "We may resoloot until the cows come home" and yet accomplish nothing unless we use the proper methods. There is not a like organization in the Union of States but is aroused to the importance of the evils that come to us



J. E. DIGBY, Secretary.

all from illegitimate competition, price cutting, trade abuses and encroachment upon the legitimate dealers' rights—catalogue houses, trading stamps, department stores, &c. And so also of the possible benefits to be derived from mutual insurance, profit sharing with employees, proper supervision of credits, syndicate buying, &c. The injured and righteously indignant Hardware dealer, from his own point of view, may sit down and bewail the injustice of and evils of wrong discrimination on the part of manufacturers and jobbers, the injury to him from catalogue houses and department stores, and the fact that some jobbers will put a special

man into his territory with instructions to keep hid from the regular Hardware dealer and to industriously work the factory, the mill, the blacksmith and the contractor's trade—these and all the numerous ills that we as a class have fallen heir to. But keep ever in mind that your only remedy is to cease your wailing and help to round into form your organization by making it so broad, so liberal, so fair and yet so strong that from its own forum you can speak in no uncertain tones and in such a way that you will receive from the proper hands a respectful hearing, and in time the right must prevail. Now I confess I do not know how strong the National

and all honorable means should be used to promote that end. This can only be accomplished by intelligent recognition of the rights of each of the interested parties—viz., the manufacturer, the jobber and the retailer—and if this meeting should develop ways and means whereby properly accredited representatives of large and small retail traders, jobbers and manufacturers could be brought together for conference, no harm could possibly come of such a meeting and that good should come of it goes without saying.

STATE PRIDE IN THE ORGANIZATION.

But, after all, the keynote should be State pride in our organization. Let us labor for its success, let us consider it a necessity, let us believe and act as though our necessity knew no bounds, let us labor for the success of the organization, realizing that it is a material part, a vital part, and an all absorbing part of every one of us. Most of us have spent the best years of our life in our chosen vocation. The results of the days, months and years of toil and self denial known to ourselves and our loved ones as well, are wrapped up in this life work. All these things should appeal to us to be loyal to the organization; therefore let us earnestly and faithfully try our best and let us keep on trying, but over and above all ways or means for the moving forward of this organization is this fact: don't allow your enthusiasm to wane. If you desire success you must cultivate enthusiasm in all work of this kind. Waning enthusiasm means failure. Enthusiasm is the magic power that is always potent. It levels the hills of difficulty and fills up the valleys of disappointment. It smooths the rough highways of toil. Enthusiasm multiplies power, it changes apparent failure into triumphant success, it wins everywhere in the battle of life, as it wins fame for the soldier and the sailor. It was enthusiasm that stood with Napoleon on the bridge at Lodi, and it was enthusiasm that filled the soul of John Paul Jones as he trod the blood stained deck of the "Bon Homme Richard," and called through the fire and smoke of apparent defeat his answer to the humane Britons' question, "Have



J. H. BOWERS, Treasurer.

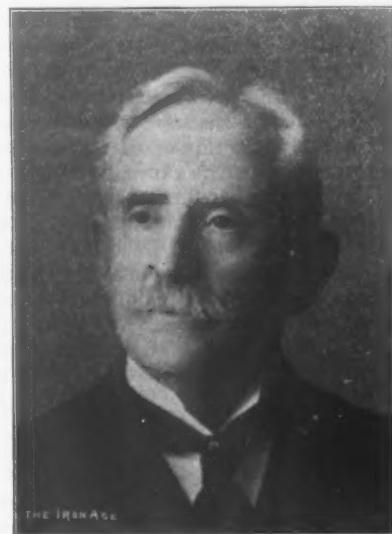
Association of Retail Hardware Dealers is or how firm are the bonds which bind us to them, for
"There are bonds of all sorts in this world of ours,
Fetters of friendship and ties of flowers, and the true
lovers' knot I ween."

In this bond we, the toilers of the retail Hardware dealers of Pennsylvania, should have a bond like unto friendship's bond; it must be so true, so strong, that we can say with the immortal bard, "The friends thou hast and their adoption tried grapple them to thy soul with hooks of steel," for are we not earnestly trying to find who are our friends and to bond them together as friends, trying also to know, and to know them well, those who seem to be working not only against our interests, but what we believe is against their own interest as well. I say to you all that the times demand some such bonding of us together.

THE ASSOCIATIONS WELL LED.

I am sure you will all agree with me that our State Association and the National Association are under the direction of men whose ability and standing at their homes and in the trade is such as will insure a liberal policy, a broad minded, judicious and firm administration of the responsibilities resting upon them, and I feel that they will always want to be sure they are right before they go ahead, and once having started on the right road will keep onward never looking back. A great reformer of the anti-slavery days said: "I will not equivocate, I will not retract a single inch, and I will be heard." To use a common saying, you will lose a mighty good part of your job, if you do not realize that the time has come when you must insist upon being heard.

In view of these facts is it not up to all of us to see to it that we give this deserving movement our hearty support. We all are thoroughly in earnest and thoroughly sincere in saying and believing that the movement and the efforts being made is deserving, and say also that it should receive the cordial recognition of both the manufacturer and the jobber. Any movement that will bring about the establishment of harmonious relations between these great branches of trade in all the various lines that go to make up the Hardware dealer's life work should be a consummation devoutly wished for,



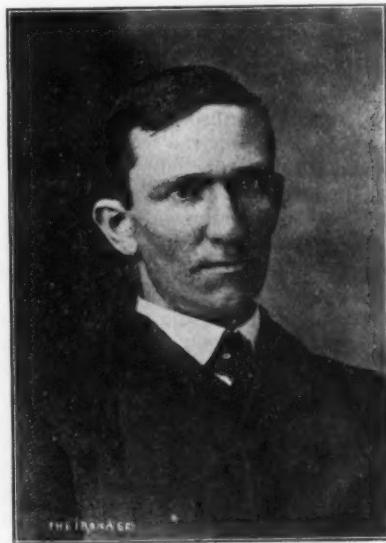
JAMES N. KLINE.

you struck your colors yet?" "No, sir; I haven't begun to fight yet." I feel that I am safe in saying that the Retail Hardware Dealers' Association of Pennsylvania can promise that it will always try to look beneath the surface and not let the several qualities of these many sided matters which may be presented or their worth, their benefits or their dangers escape their vigilance, their judgment, their conscience or their intelligence. I believe those in authority—viz.: the officers and the Executive Board—realize that they serve not themselves but the association, striving always to accomplish the most good for their organization, by the faithful and unselfish performance of their whole duty, keeping in mind always that these complex business problems, which, owing to their very natures, are almost sheer impossi-

Pennsylvania Hardware Association.

bilities for an individual to solve, are easily and correctly worked out by co-operative endeavor. Every member should strive to impress this upon his fellow toilers in the Hardware trade, who have not as yet taken advantage of the opportunities afforded by this association. The fact is

THAT SUCCESS IN THE HARDWARE BUSINESS to-day can only be accomplished by a judicious combination of individual work along certain lines of energetic business endeavor, and with tolerance for the rights of



W. B. SIMPSON, Secretary of Insurance Association.

others, yet prompt in grasping opportunities; for the opportunities lost by you to-day often prove to be the other fellow's opportunity to-morrow. It has been said opportunity knocks once at every man's door. My fellow toiler, it is knocking at your door to-day. I believe that from this meeting will come good results. I believe that the way is paved for a closer bond of union among us all. I believe that it is also well to follow David Harum's advice in the horse trade—viz., that it is well sometimes to give the other fellow a chance. Let us have consideration for all. Let us have this effort to include, if possible, even the consumer. This can only be brought about by the individual efforts of the retail dealer himself. This I believe should be the study of every retail dealer. Touch your fellow man's heart by being his friend and he will not only become your customer, but your friend, and if you do not strive to accomplish this you are not a good student of human nature. We should never forget that humanity is the unit, of which man is but the fraction, and that one touch of nature makes the whole world kin.

BE PROGRESSIVE.

have up to date business methods in the conduct of your business; be in love with your vocation, for whoever achieves success in any walk of life must not be half-hearted in his work. Success always comes to those who make their very life's blood a part of their work. What the Puritan gave to the world was not thought alone, but action. For action was existence given thee; by action, and by action alone, determine thy worth; action, with industry, work and method in your work, and keeping everlastingly at it brings success, and success should come to this organization. Don't fret, don't worry; it will come if you but strive and keep striving aright. The whole history of the world proves that truth is mighty and will prevail. Now, if your proposition as an association is fair, just and right, it will stay and it will thrive; if it is wrong and unjust, it will disintegrate and pass away. For

"Men, my brother, men, the workers; ever reaping something new."

That which they have done the earnest of the things that they shall do.

Yet I doubt not through the ages one unceasing purpose runs,
And the minds of men are widened with the progress of the suns."

Local Organizations.

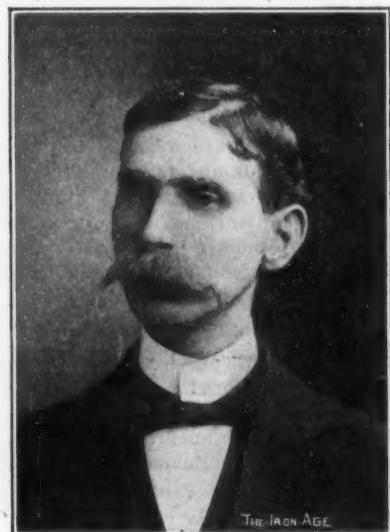
Following was the paper by J. F. Frye of Charleroi on "Local Organizations:"

Organized effort at this date does not need any apology. We see its workings in every trade, every industry, almost every avocation, and take it for granted that all present see the wisdom of such movements. It is not because the organization of retail Hardware dealers needs any further advocacy than has already been given that I have selected this subject, but it strikes me that a purely local effort in this direction is at present needing our attention. The State associations and the National Association are accomplishing results beyond our expectations, but there are questions arising in localities that are peculiar to those localities and can be best adjusted or at least be brought to a fair way of adjustment by those who are immediately concerned; and hence there seems to me a necessity for some local association or organization to take cognizance of such matters, and with the applied effort of its members get the issue in shape for the State Association to make quick disposal of.

The monthly or quarterly meetings of the local association keep its members in close touch with the trend of events, and thus keeps at high pressure the enthusiasm that the State convention has aroused. Without this enthusiasm but little would be accomplished, and I would say exert your every possible energy to keep it up. You will find it the most potent element of success in every undertaking. These frequent meetings will do much to eliminate that cut-price system that stands as a barrier to friendly relations between competitors. There will be formed an irresistible desire to arrive at

A BETTER UNDERSTANDING among competitors, and thus will ensue a readjusting of prices by mutual consent. This is sure to happen if a fairly interested effort is made to that end.

With regard to extent of local organizations they need not take in a large scope of country. In fact, much



J. F. FRYE.

better results can be obtained if the territory be such as is easily accessible to all dealers in that territory. But by all means every dealer should deem it not only a duty but a privilege to be a member.

The work of organizing is too frequently left to a few and, in fact, the little interest at first manifested almost defeats the plans of those who have the movement at heart, and it falls upon those who have the matter in hand to make the call for such meetings as nearly irresistible as possible. Each individual constitutes a part of the whole, and as the individual effort is concentrated in one great object, that object is certain of being accomplished.

Local disturbances often exist in the onward movement of trade and the remedy often lies at our door if but the advice and encouragement of our neighbors were sought and given, and herein much of the evil that now exists might have been obviated if we could only have some one to relate our woes.

INTEREST, PROFIT, FRIENDSHIP.

Local organizations can and do assist members to reap more of the benefits of trade than the mere individual can ever attain, for at the meetings are continually coming up the ever interesting and profitable topics of what lines are most profitable and what are least. Systems and methods are discussed and all can learn. The question of giving your competitor an advantage is not at all sustained, as all are alike



C. H. MILLER, President of Insurance Association.

benefited, and the friendly feeling that is sure to flow from such gatherings results often in explanations that otherwise may never have occurred. You will find these meetings keep alive within you the issues that interest you most and thus will be created a taste for the higher side of our avocation.

Our avocation. It is one of the most useful and honorable, but it has been assailed by catalogue houses, &c., until our patrons look upon us with distrust. Into every corner of this land there have gone these catalogues, freighted with misrepresentations so worded as to deceive many.

A change is ever going on in the commercial world and it is our duty to adjust our methods to this change. I can see no better way to feel the pulse of events than through the local organizations. They broaden our views, strengthen our purposes and fit us best for our chosen avocation. But as I understand this paper is only to open the discussion, I will give way to those who are better equipped to handle the subject.

Resolutions.

The Committee on Resolutions reported the following, which were adopted by a unanimous vote of the association:

Resolved, That the thanks of the association are due to the Committee of Arrangements, and especially to J. E. Digby, our efficient secretary, for valuable services which have done much to render the meeting successful and enjoyable.

Resolved, That we as an association recognize the courtesy of the proprietors of the Monongahela House in facilitating as far as they could the work of the association and serving the convenience of the officers and members.

Resolved, That we extend to the jobbers and manufacturers our thanks for the financial assistance given to the carrying on of the convention and for many courtesies and attentions.

Resolved, That we appreciate the attendance at the convention of T. James Fernley and R. R. Williams, and the valuable service which is constantly being rendered by *The Iron Age* in the furtherance of association work and the general welfare of the Hardware trade.

Resolved, That we greatly value the presence at this convention of H. G. Cormick, president of the National Retail Hard-

ware Dealers' Association, and the benefits of his wise counsel and eloquent words, and that we assure him of our hearty interest in the work of which he is the official head.

Resolved, That we acknowledge gratefully the important aid which has been rendered the association through the efforts of the traveling salesmen in increasing the membership and commanding the organization to the approval of the trade at large.

Resolved, That we recommend the insurance feature of the association to Hardware merchants throughout the State, and urge them to take advantage of the opportunities which it offers and thus give it their practical support.

Next Meeting.

In view of the fact that two meetings have been held at Pittsburgh, as situated in the part of the State from which the membership is very largely made up, it was deemed advisable that the next meeting should be held elsewhere with a view to encouraging an increase of membership through the State at large. A very cordial invitation extended by James N. Kline of Williamsport for the convention to meet next year in that city was accepted. The following committee to make arrangements for the meeting in 1904 was appointed: G. C. Kline, Williamsport; J. M. Selheimer, Lewistown; G. W. Hackett, Allegheny City.

Officers.

In accordance with the report of the Committee on Nominations, the following officers were unanimously chosen:

PRESIDENT, Geo. L. Moore, Brownsville.
VICE-PRESIDENT, Geo. J. Rudolph, Pittsburgh.
SECRETARY, J. E. Digby, McKee's Rocks.
TREASURER, J. H. Bowers, Charleroi.

Banquet.

An elaborate banquet, largely attended by the members and guests and a goodly number of ladies, was given on Wednesday evening. R. H. Geiger officiated as toastmaster, and addresses were made by H. G. Cormick, T. James Fernley, R. R. Williams and Geo. R. Wallace.

Insurance Company Meeting.

Following the meeting of the Retail Hardware Dealers' Association, the directors of the Hardware Dealers' Fire Association of Pennsylvania held their annual meeting and elected the following officers: President, C. H. Miller, Huntingdon; vice-president, George V. Thompson, Mt. Jewett; treasurer, George W. Hackett, Sunbury; secretary, Warren B. Simpson, Huntingdon.

Although the company have been doing business for a period of only six months, they have in force \$300,000 insurance and have received cash deposits to the amount of over \$4300. They have 150 members and indications are that a great saving in the cost of insurance will result to the members. They have to report no losses to date. The fire association have been well received by the dealers throughout the State as offering the best protection at actual cost for same. The risks are all carefully selected, and being well scattered, there is little likelihood of a large fire loss. The membership is not limited to members of the Pennsylvania Retail Hardware Dealers' Association, but any Hardware dealer in the State, either wholesale or retail, may be insured, provided his risk is a desirable one. The management of the company is under the direct supervision of Secretary W. B. Simpson of Huntingdon, who is an insurance man of many years' experience.

In response to the demand from dealers outside of the State wishing to insure with the company, the directors decided that they would accept selected risks in adjoining States.

WYOMING SHOVEL WORKS' FIRE.

A FIRE on the evening of February 26 did considerable damage to the Wyoming Shovel Works, Wyoming, Pa. The fire started in the finishing department of the Shovel plant. The buffing and belting, and the Varnish rooms were entirely destroyed, and part of the Shovel warehouse was burned. While the output of Shovels will necessarily be suspended until new buildings are erected, the rolling mill department and the Handle plant will continue in full operation.

PRICE-LISTS, CIRCULARS, &c.

THE AVERY STAMPING COMPANY, Cleveland, Ohio: Circular illustrating the Cleveland pattern Hollow Back and patented Plain Back Shovels and Spades; also Snow, Ash, or Furnace Shovels and Side Walk Scrapers.

THE UNION METALLIC CARTRIDGE COMPANY, Bridgeport, Conn.: Attractive colored hanger, relating to the U. M. C. Nitro Club factory Loaded Shells.

FRIEDLEY & VOSHARDT, 194-202 Mather street, Chicago, Ill.: Illustrated price-list of Corrugated Expanding Conductors, Sheet Zinc, Sheet Copper, Galvanized Iron, Roofing, architectural Ornaments, statuary, &c.

THE MICHIGAN WHEELBARROW & TRUCK COMPANY, Saginaw, Mich.: Budget of circulars illustrating Bag Holders, Trucks and Wheelbarrows, in large variety, Salt Carts, Car Wheels, &c.

THE OHIO STRUCTURAL IRON COMPANY, Sandusky, Ohio, successors to the Crandall Fence Company: Illustrated Catalogue A relating to Fences, Gates, Fire Escapes, Lawn Seats, &c. In addition the company are prepared to furnish Hitching Posts, Railings, Elevator Enclosures, Window Guards, Stable Fittings, Iron Doors, Balconies, Shutters, Stairs, Gratings, &c. The shops of the company have been overhauled and new and additional facilities for rapidly turning out work are being installed. W. W. Crandall, the inventor of the Crandall Iron Fencing, remains as superintendent under the new ownership.

FARWELL, OZMUN, KIRK & CO., St. Paul, Minn.: Catalogue devoted to Bicycle Sundries and Summer Sports; also pamphlet relating to Crawford 1903 Bicycles.

THE COLUMBUS BRASS COMPANY, Columbus, Ohio: Catalogue F 11, illustrating Brass Railings, Marble and Slate Stall Trimmings and Fittings, Toilet Fixtures, &c. The company have increased their facilities considerably for the manufacture of a complete line of Nickel Plated Stall Trimmings and Brass Railings.

BUTLER BROTHERS, New York, Chicago and St. Louis, issue an interesting booklet, entitled "A Little Story of a Large Success." The booklet contains a history of the beginning and growth of their extensive business, and gives suggestions as to how merchants may increase their trade, and the desirability of branching out into other lines.

LEGGETT & BROTHER, 301 Pearl street, New York: Agricultural Specialties. An illustrated pamphlet is devoted to descriptions of Dry Powder Dusters, Insecticides, Fungicides, Liquid Sprayers, &c.

THE J. S. KEMP MFG. COMPANY, Newark Valley, N. Y.: The Twentieth Century Manure, Lime and Fertilizer Distributor. A catalogue illustrates and describes the machine, in which a new device has been recently incorporated for changing the feed or spread of material, by operating a foot lever. This device is referred to as being peculiar to this machine.

BUTCHER POLISH COMPANY, 356 Atlantic avenue, Boston, Mass.: Booklet giving a full description, with directions for use, of their Boston Polish, for furniture, floors and interior wood work, which they offer to the Hardware trade. The Boston Polish has been on the market for many years, and is widely used.

ATHOL MACHINE COMPANY, Athol, Mass.: Circular referring to their line of Iron Grindstone Frames with adjustable tool rests and truing attachments, with water guard and adjustable tool rest, and with adjustable tool rest, truing attachment and water pot. The manufacturers claim that these Frames are strong and durable and are superior to anything in this line they have heretofore produced.

George Haw & Co., wholesale Hardware, Ottumwa, Iowa, have recently incorporated under the style of Haw & Simmons Company. The capital stock is \$150,000, fully paid up. The members of the former firm of Geo. Haw & Co. are the stockholders in the new company, and there will be no change in the personnel or management of the business. The officers are as follows: Geo. Haw, president and treasurer; Chris. Haw, vice-president; F. W. Simmons, secretary.

AMONG THE HARDWARE TRADE.

Gonser & Baughman, Hardware merchants, Ashley, Ind., have dissolved by mutual consent. W. F. Baughman has purchased his partner's interest, and will continue the business under his own name.

Beebe, Lehmkuhl & Co. have disposed of their business in Wahoo, Neb., to Lehmkuhl & Wenstrand, who will continue at the old stand.

Page & Morris are successors to C. E. Wilcox in the Hardware business in Carney, O. T.

Amberg Bros. have bought the Hardware business formerly conducted by Chas. A. Kastl in Malmo, Neb. The new firm will enlarge the establishment and put in a line of furniture. They will also open a branch store in a nearby town, Swedeburg.

M. C. Messer Hardware Company have purchased the business of S. D. Thompson in Cassville, Mo.

The firm of **Sewall & Sanborn**, Wilton, Maine, have dissolved, and Mr. Sanborn has retired. Dana Sewall, a son of N. W. Sewall, has been taken into the business, which will be continued under the style of N. W. Sewall Company.

E. J. Haddon, Clayton, Mich., has bought Mr. Fluke's stock of Hardware and groceries, and will continue the business.

Wonser & Ham, Hardware dealers, Hennepin, Ill., have dissolved, and E. E. Wonser is sole successor.

Timothy O'Brien has disposed of his interest in the Hardware firm of O'Brien & Maxfield, Potsdam, N. Y., to Fred. Needham, and the business will be continued under the style of Maxfield & Needham.

Miller Hardware Company, Olean, N. Y., have incorporated under the same name, with a capital of \$30,000. The incorporators are A. F. Miller, A. E. Ewing, O. R. Canfield and L. L. Miller. They are intending to continue the wholesale and retail business, pushing it with even greater energy than heretofore.

Burns Hardware Company, Sumter, S. C., have been incorporated with a capital of \$10,000. The company are successors to the firm heretofore doing business under the same name, consisting of W. B. Burns and William Moran, who are the interested parties in the new concern.

The Hardware and Farm Implement business of **Wilton & Tillotson**, Charleston, Ill., has been purchased by a new firm under the style of **Pendergast, Whalen & McCarthy**, who continue at the old stand. They are intending to enlarge the premises.

I. J. Clabaugh & Sons, New Hampton, Mo., have sold out to **New Hampton Hardware Company**, who will continue the Shelf and Heavy Hardware, Tinware, Farm Implement, Buggy, Sporting Goods and furniture business.

Hulse & Farnham have sold their Hardware business in Sheridan, Wyo., to **Lord & Poll**.

W. E. Harrison & Co. have opened a Hardware store in Florence, Ala. They will also conduct a tin shop, doing roofing and all kinds of metal work.

MISCELLANEOUS NOTE.**C. W. Hubbard's Hollow Ground Axe.**

The American Axe & Tool Company, 253 Broadway, New York, have for several years been manufacturing their C. W. Hubbard's patent hollow ground axe in silver

bronze finish, but are now for the first putting it on the market in blue finish and offering it at attractive prices. They do this in connection with an effort on their part to encourage the purchase of their own brands. In their announcements to the trade they refer to the favor with which this patent axe has been received, and call attention to the advantages of the shape in which it is made, and especially to the fact that the bit is hollow ground, giving a chisel shaped cutting edge with special penetrating power, making the axe very easy chopping. They also claim that the hollowing of the blade above the cutting edges frees it from any tendency to bind or stick. The axe is made in all standard patterns and is packed regularly a dozen in a box.

The White Lily Washer.

The White Lily washer, which is being placed on the market by the White Lily Washer Company of Davenport, Iowa, is shown in the accompanying illustration. It is a high speed rotary washing machine, the movement being a tilting rack working over and under a pinion on the fly wheel shaft, causing a segmental rack



The White Lily Washer.

to work longitudinally on a pinion connected with the dasher pole. It is stated that $2\frac{1}{2}$ turns of the fly wheel make one turn and a return of the dasher. The fly wheel is 22 inches in diameter, being, the manufacturers claim, considerably heavier than the average wheel of this kind, while by a new process they are able to cause a direct stroke, bringing the weight to the outside of the wheel. The tub is made of red cypress.

Outside Blind Anchor.

Thomas G. Duncan, 1768 Fulton street, Brooklyn, N. Y., has just placed on the market the outside blind anchor, here illustrated. This is a device made of malleable iron, steel and brass, for locking house blinds open. In use the malleable iron plate, $1\frac{1}{8}$ inches long, is screwed to the window frame, Fig. 1 showing it raised and out of the way to allow closing of the blind. Fig. 2 illustrates it dropped downward to lock the shutter open, the steel arm being $3\frac{1}{2}$ inches long. At the end of the arm are two steel buttons, $\frac{1}{8}$ inch in diameter, fastened to a brass screw, by means of which a quick adjustment is instantly made, as indicated in Fig. 2. In the end of

the arm nearest the plate is a slot $1\frac{3}{16}$ inches long, so that when not in use it can be raised and dropped slightly downward, so as to keep the arm from falling forward. When needed the arm is raised a little and allowed to drop forward into position to keep the blind

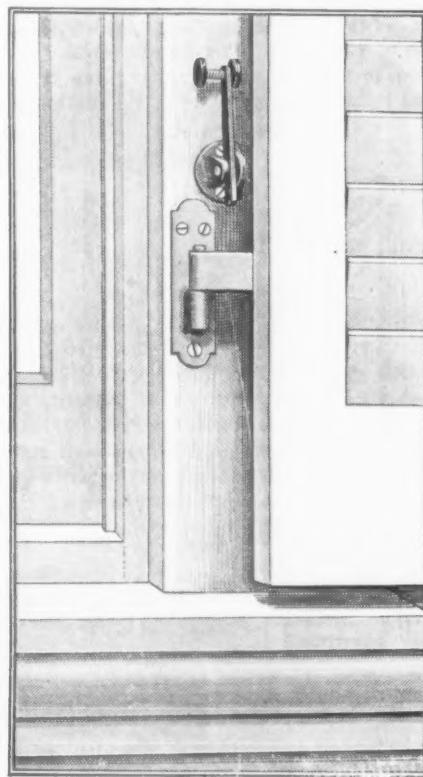


Fig. 1.—Outside Blind Anchor, Raised to Allow Blind to Close.

open. The arm is fastened to the plate by a brass pin. The anchor is made for wood or brick buildings and can be used on either right or left hand. Among its advantages the following are noted: That it can be operated

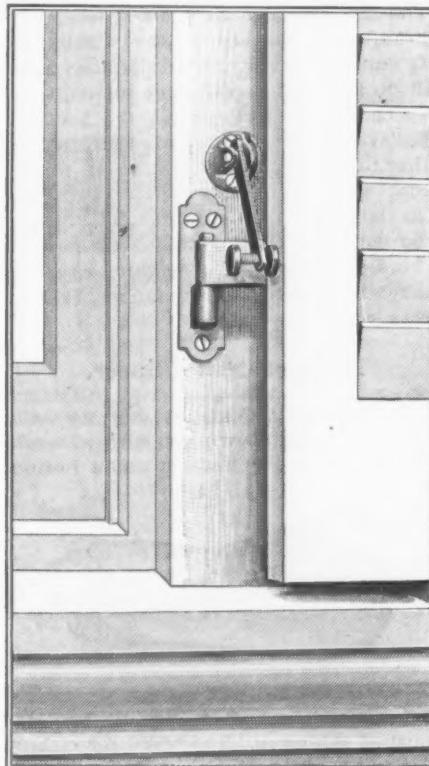
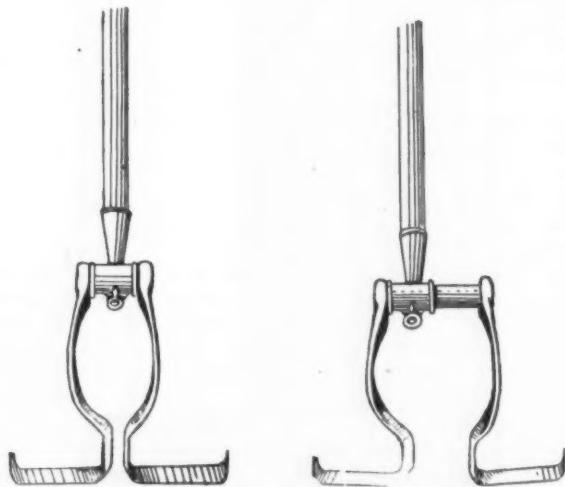


Fig. 2.—Anchor in position to Keep Blind Open.

without leaning out of the window; that there is no rattling, slamming or breaking of blind or hinges; that it can be easily applied, and that there is no interference with any fastenings there may be on the blind.

The Eureka Beet Hoe.

W. H. Anderson & Sons, Detroit, Mich., are offering the hoe shown in the accompanying cuts, designed for use by beet growers and garden truck farmers. The blades of the hoe are made of a special grade of imported steel to give them strength and durability. The handle is screwed into the clamp which encircles the extensions of the arms. The handle socket is provided with a hole, in which a nail or other piece of metal may be inserted to aid in tightening up the clamp. The arms to which the blades are attached can be set close to-

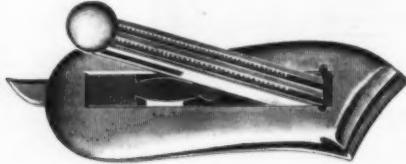


The Eureka Beet Hoe.

gether or extended to considerable width, as shown in the illustrations. In the right hand of the two cuts the handle is shown moved to one side. The handle can be moved either right or left, which enables the operator to see the row that is being hoed without stooping or getting into an uncomfortable position. The hoe may be set to straddle a row of plants, the bowed arms preventing injury to the leaves, at the same time allowing the ground close to the plant to be reached without difficulty. The hoe can also be used spacing across the rows. By adjusting the hoe to any width, the plants can be left standing at a uniform distance apart. The handle can be adjusted to different heights, so that the tallest man or the shortest can set the hoe to suit his own particular requirements. This feature is referred to as peculiar to this hoe. It is pointed out that it makes no difference whether the hoe is set close together or extended to its widest points, the blades always remain flat, and do not raise on the outside corners; and that with the blades thus flat the operator can cut evenly and in a much more satisfactory manner, besides saving much time.

The Apt Nail Clipper.

The Little River Mfg. Company, Seymour, Conn., are offering the nail clipper shown herewith. To release the lever, which operates the jaws, a small button underneath



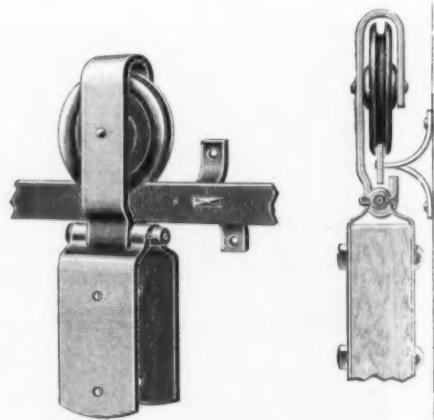
The Apt Nail Clipper.

neath is pushed sideways. The blade for cleaning nails and for pushing back the cuticle is brought into use by pushing the same button forward. Reversing these operations closes the clipper for carrying in the pocket. The jaws of the clipper are on an angle suited to operation with the left hand, the right hand, it is remarked, being able to take care of itself. This is referred to as a new feature. It is pointed out that the clipper shears

the nails, making a clean cut, requiring but little pressure. The clipper when closed measures 2 inches in length, and is nicely made, being finished in nickel plate.

The Lane New Hinged Hanger Rail.

The Lane Brothers Company, Poughkeepsie, N. Y., are placing on the market a new hinged hanger rail shown herewith, having modified their hinged hangers for use in connection with it. The rail is referred to as reducing the cost below that of the wider and old style rail by the use of brackets which permit the adoption of standard size 1 x 3-16 inch rail stock. It is pointed out that all the advantages of the former are retained, while the rail illustrated is much stronger. The bracket occupies little vertical space where it is attached to the rail, this being accomplished by a tenon at its outer end being mortised through the rail, and riveted down solidly on the shoulders at the back of the tenon. The point is made that the arms of the brackets act as tensile and compression members of a truss to support the double width horizontal portion that extends through the rail. Another point of superiority claimed is that the screw-

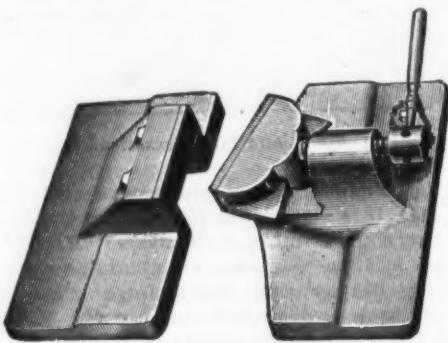


The Lane New Hinged Hanger Rail.

holes are not vertically in line, so that the screws do not tend to split the wood when applied to buildings having vertical siding.

The Massey Divided Vise.

Massey Vise Company, Chicago, are placing on the market the Massey divided vise, shown in the accom-



The Massey Divided Vise.

panying illustration. The vise is designed for use on the table of a planing machine, where the two halves can be fixed any desired distance apart, for holding pieces of various lengths and widths. The work is simply dropped into the vise, the screw set up and the bevel jaws—a feature, it is stated, peculiar to this make of vise—force the work down hard and evenly on to the body of the planer, thus insuring that the work be chucked instantly and automatically onto the body of the planer. Two styles are made—one, No. 60 design, for larger work and having jaws 3 1/4 inches deep; the other, No. 61, used for holding strips or other work that has been set true to the edge. The lower edges of the jaws are fully 5/8 inch from the body of the planer.

The Hammond Quick Action Adjustable Wrenches.

The Hammond Mfg. Company, 288 Congress street, Boston, Mass., have just brought out a line of quick action adjustable wrenches in two styles; one for pipe and the other for general work. Fig. 1 shows the Hammond Quick Action monkey wrench, which can be adjusted in-



Fig. 1.—The Hammond Quick Action Monkey Wrench.

stantly with one hand. The wrench consists of a drop forged steel bar and head in one piece with a wood handle set in a steel ferrule and held firmly in place by a nut. The movable back jaw slides freely on the bar when not in action, the engaging block being raised by means of two small springs. The distance of the open-

wrench cannot lock on or crush the pipe. The removable jaw can be replaced when worn. It is made in four sizes—8, 14, 18 and 24 inches.

Useful Razor Guard.

J. Curley & Bro., 6 Warren street, New York, have just put on the market the Useful adjustable razor guard

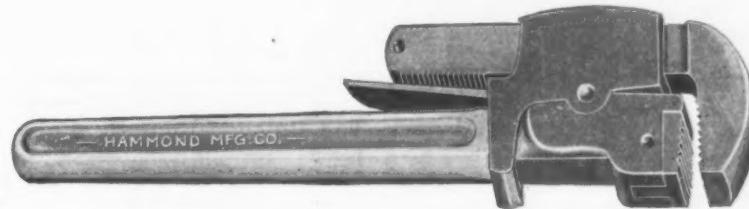


Fig. 2.—The Hammond Quick Action Pipe Wrench.

ing having been determined, a simple pressure of the thumb on a conveniently located lever causes the block to engage 12 teeth on the bar and holds the jaw immovable in the position desired until released by the operator. The manufacturers claim that this wrench is simple to operate and is very strong, and will not mar ow-

here illustrated. This guard is instantaneously adjustable to any ordinary razor, this being accomplished by means of the two vertical thumb screws, a few turns of each making the edge of the guard uniform with the edge of the razor. The various parts are polished and nickelated, so they will not rust or corrode. The edge

of the guard is slightly corrugated. An advantage other than the quick adjustment is the facility with which the guard can be removed or replaced for honing or drying the razor blade. With any razor blade in proper order even an inexpert individual, it is said, can quickly cover the face without the possibility of shaving too close or

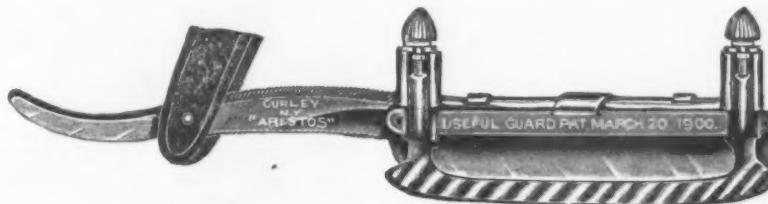


Fig. 1.—Useful Adjustable Razor Guard Attached to Razor.

ing to there being no lost motion. All parts are interchangeable and the materials used in the wrench are of the best. It is made in four sizes; 8, 10, 12 and 15 inches. Fig. 2 shows the Hammond Quick Action pipe wrench, and gives a good idea of the general construction of the tool. The parts are interchangeable and are made of

cutting the skin and in much less time than with a regular razor.

The Smith-Gill Hardware Company have just commenced business in the Casse Grand block on Second avenue, New Decatur, Ala., in the wholesale and retail



Fig. 2.—Same Guard, Reverse Side.

carefully selected stock. The operation of this wrench is similar to that of other pipe wrenches, only, it is stated, it can be adjusted much quicker and with greater ease with one hand. The grip is strong and sure, and may be released instantly. The manufacturers refer to this as an important point both in saving time and in preventing marring of the pipe. It is claimed that this

line. The firm is made up of E. D. Smith, formerly of Smith & Gamble, Watumpka, Ala., and H. T. Gill, who has represented the Todd-Donigan Iron Company of Louisville, Ky., on the road for several years, a connection which will be continued. A general stock of Shelf and Heavy Hardware will be carried, as well as Mantels, Grates, Stoves, Ranges, Paints, Oils and Glass.

The Ray Electric Heated Urn.

The electric heated urn, shown herewith, is made from heavy material and furnished nickel plated outside, also all silver plated, silver lined and satin finish

*An Electric Heated Urn.*

inside. It has a capacity of 9 pints, and can be arranged to be heated with either the Edison or Thompson system. The urn is being introduced by the Geo. A. Ray Mfg. Company, Buffalo, N. Y.

The Lumo Gas Burner.

The Acorn Brass Mfg. Company, Chicago, are placing on the market the gas burner shown in the accompanying cut. The special feature of the burner is the

*The Lumo Gas Burner.*

delivery of gas, with a rotating motion, to the mantle which surrounds and overhangs the burner. As the gas is delivered it is mixed with air on the well-known principle of the Bunsen burner, the gas and air expanding as the temperature is raised. The centrifugal force brings combustion at the circumference, but not at the center of the cone. The result of the burning of gas

through the meshes of the mantle is referred to as being a dazzling incandescence, and as contributing to economy in consumption of gas and even illumination.

Improved Seamless Milk Can Cover.

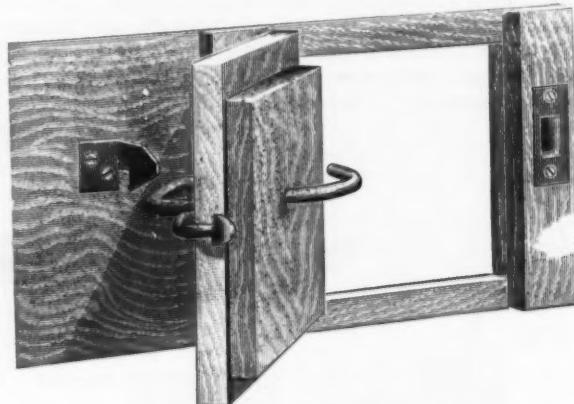
Sturges & Burn Mfg. Company, Harrison and Green streets, Chicago, Ill., are offering the new improved seamless cover shown herewith. It is made with a solid bottom and without a seam. The following advantages are claimed for the cover: That there is no place for sour milk to collect; that milk cannot sour as quickly in a can fitted with this cover, as the bottom is directly

*Improved Seamless Milk Can Cover.*

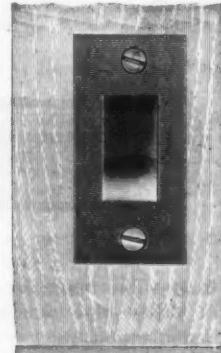
on top of the milk and away from the heat of the sun; that the cover prevents churning, so important in keeping milk sweet; that the cover is much stronger than others, with no edges to become dented and rust out of shape, and that it has an air vent to release and to prevent the splattering of the milk.

The Daisy Automatic Barn Door Steel Latch.

Matthias-Wagner Company, Cedar Falls, Iowa, are placing on the market the barn door steel latch shown in the accompanying illustrations. One of the most important features of the device is that the latch is flush with the outside surface of the door. Another is that

*Fig. 1.—The Daisy Automatic Barn Door Steel Latch.*

the door is held open as well as shut, and can be opened from either side equally well. The handle is bent of one solid piece of steel, and the spring is made of galvanized steel wire. The point is made that no cutting of

*Fig. 2.—The Flush Catch of the Daisy Latch.*

the barn door is required, as a $\frac{1}{2}$ -inch hole is all the opening necessary. The latch is easily put in place, and is automatic in action.

Current Hardware Prices.

REVISED MARCH 10, 1903.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 $\frac{1}{3}$ @33 $\frac{1}{3}$ &10% signifies that the

price of the goods in question ranges from 33 $\frac{1}{3}$ per cent. discount to 33 $\frac{1}{3}$ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued April, 1902, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Admirite in Carloads: Crystal..... \$ per ton \$90@100
Grits..... \$ per ton \$120@140
See also *Emery*.

Adjusters, Blind—

Domestic @ doz. \$3.00..... 33 $\frac{1}{3}$
North's..... 10%
Zimmerman's—See *Fasteners, Blind*.

Windup Stop—

Ives' Patent..... 25&5%
Tipton's Perfection..... 25&5%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Arm and Hammer, Wrought \$35@80%
Buel Patent Trenton..... \$ per ton \$100@120
Eagle Anvils..... \$ per ton \$70@73 $\frac{1}{2}$
Hay-Budden, Wrought..... \$ per ton \$90@94
Horseshoe brand, Wrought..... \$ per ton \$90@94

Imported—

Peter Wright & Sons..... \$ per ton 10%
Anvil, Vise and Drill—

Millers Falls Co., \$18.00..... 50&10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Hull Bros. Co.:
Lots of 1 doz..... 25%
Smaller Lots..... 30%
Lots of 3 doz..... 30%

Augers and Bits—

Com. Double Spur..... 70c@75%
Worming Machine Augers..... 70c@75%
Car Bits, 12-in. twist..... 60@60&10%
Jennings' Pattern.....

Auger Bits..... 50c@10c@50%
Ford's Auger and Car Bits..... 40%
Porter Pat. Auger Bits..... 25%

C. E. Jennings & Co.:
No. 10 ext. tip. R. Jennings' list 25&10%
No. 30. R. Jennings' list 40c@7%&10%
Russell Jennings'..... 25&10&25%

L'Hommedieu Car Bits..... 15&10%
Mayhew's Countersink Bits..... 45%
Millers' Falls..... 50&10&15%
Pugh's Black..... 20%
Pugh's Jennings' Pattern..... 35%
Senn's Auger Bits..... 60%
Soil's Bell Hangers' Bits..... 50&10%
Soil's Car Bits, 12-in. twist..... 60%
Wright's Jennings Bits (R. Jennings') list..... 50%

Bit Stock Drills—

Standard List..... 65c@5@70%

Expansive Bits—

Clark's small, \$18; large, \$20..... 50&10%
Lavigne's Clark's Pattern, No. 1, \$ per doz. \$20; No. 2 \$18..... 50&10%
C. E. Jennings & Co., Steer's Pat. 25&10%
Swan's..... 60%

Gimlet Bits—

Common Double Cut, gro. \$2.50@5.00

German Pattern..... gro. \$4.00@4.25

Hollow Augers—

Bonney Pattern, per doz. \$11.00@11.50

Alnes..... 25&10%

New Patent..... 25&10%

Universal..... 20%

Wood's Universal..... 25%

Ship Augers and Bits—

Ford's..... 40%

Stull's..... 40%

C. E. Jennings & Co.:
L'Hommedieu's..... 15&10%

Watrous'..... 33 $\frac{1}{3}$ @10%

Awl Hafts, See Hafts, Awl.

Awls—

Brad Awls: Handled..... gro. \$2.75@3.00

Unhandled, Shouldered, gro. 65@80c

Unhandled, Patent..... gro. 60@70c

C. E. Jennings & Co.: Cuhanded, Patent..... \$1@35c

Unhandled, Shouldered, gro. 65@70c

Scratch Awls:

Handled, Common, gro. \$3.50@4.00

Handled, Socket, gro. \$11.50@12.00

Burwood..... 40%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First Quality, factory brands..... \$6.00

First Quality, jobbers' brands..... \$6.50

Second Quality..... \$5.00@5.25

Axle Grease—See Grease, Axle.

Axes—Iron or Steel

Concord, Loose Collar..... 4 $\frac{1}{2}$ @5c

Concord, Solid Collar..... 5 $\frac{1}{2}$ @5c

No. 1 Common..... 5 $\frac{1}{2}$ @4c

2 $\frac{1}{2}$. Com. New Style..... 5 $\frac{1}{2}$ @4c

No. 2 Solid Collar..... 5 $\frac{1}{2}$ @4c

11 to 14..... 60c@10c@10c@5%

15 to 18..... 75c@10c@10c@5%

19 to 22..... 75@75c@10c@5%

Belt—Rubber—

Agricultural (Low Grade). 75c@10@80%

Common Standard..... 75@70c@10%

Extra..... 80c@10c@5%

High Grade..... 60c@10@10c@5%

Boston Belting Co.: Seamless Stitched Imperial..... 45c@5c

Boston..... 50c@5c

Niagara..... 50c@5c

Leather—

Extra Heavy, Short Lap..... \$0@80c@5c

Boxes, Axle—

Common and Concord, not turned.....

lb. 1 $\frac{1}{2}$ @4c

Common and Concord, turned.....

lb. 1 $\frac{1}{2}$ @5c

Half Patent.....

lb. 5@5c

Balances—Sash—

Caldwell new list..... 50c

Puliman's..... 60%

Spring—

Spring Balances..... 50@10@80%

Chattillon's:

Light Spx. Balances..... 40c@10%

Straight Balances..... 40c

Circular Balances..... 50c

Large Dial..... 30c

Petouze..... 50c

Barb Wire—See Barb, Barb.

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb.

2 $\frac{1}{2}$ @4c

Towel—

No. 10 Ideal, Nickel Plate, \$ per gro. \$8.50

No. 20 Ideal, Brass Finish, \$ per gro. \$8.50

Baskets—

Hoffman's Brick Baskets..... each \$3.25

Beams, Scale—

Common Beams, List Jan. 12, '92. 40c@10@10%

Chattillon's No. 1..... 30%

Chattillon's No. 2..... 40%

Beaters—Egg—

Lightning Chain, 2 doz. \$1.15; \$ per gro. \$12.00

National Mfg. Co.: No. 1 Dover, Family size..... \$ per gro.

No. 2 Dover, Hotel size..... 14.00

Taylor Mfg. Co.: No. 60 Improved Dover..... \$ per gro.

No. 75 Improved Dover..... 50.50

No. 75-2 Imp'd Dover, Tin'd..... 59.00

No. 100 Improved Dover..... 88.00

No. 102 Improved Dover, Tin'd..... 89.50

No. 150 Improved Dover, Hotel, T'd..... 15.00

No. 152 Imp'd Dover, Hotel, T'd..... 17.00

No. 200 Imp'd Dover Tumbler, Tin'd@10.00

No. 300 Imp'd Dover Mammoth, \$ per doz. \$27.00

Wonders (S. S. & Co.)..... \$ per gro. \$6.00

Belows—

Blacksmith, Standard List. 70@70@10%

Blacksmiths'—

Inch... 30 32 34 36 38 40

Eac. 1.50 3.50 3.75 4.25 4.50 5.50 6.15

Extra Length: Each. \$4.00 4.55 5.10 5.50 6.40 7.50

Net Prices.

Molders—

Inch... 9 10 11 12 13 14 15 16

Doz.... \$8.75 7.35 8.50 9.50 12.00 11.50

Hand—

Inch... 7 8 9 10 12

Doz.... \$4.75 5.20 5.75 6.25 7.00 8.00

Door—

Ordinary goods..... 75c@75@10@10%

High grade..... 70@70@10%

Jersey..... 75@10@10%

Texas Star..... 50%

Bell—Cow—

Ordinary goods..... 75c@75@10@10%

High grade..... 70@70@10@10%

Jersey..... 75@10@10%

Silver Star..... 50@50@10@10%

Yankee Gong..... 55c@50@10@10%

Hand—

Hand Bells, Polished..... 60c@60@10@10%

White Metal..... 55@55@10@10%

Nickel Plated..... 50@50@5c

Swiss..... 60@60@7c@5c

Cone Glare Hand Bells..... 55@55@10@10%

Silver Chime..... 55@55@10@10%

Miscellaneous—

Farm Bells..... lb. \$2@24c

Steel Alloy Church and School Gongs..... 70c@70@10@10%

American Screw Company: Bay State, Ile. Lee 28, '99..... 55c

Norway Phila., list Oct. 16, '84..... 82.65

Eagle Phila., list Oct. 16, '84..... 85c

Eclipse, list Dec. 28, '99..... 77.65

Russell, Burdett & Ward Bolt & Nut Co.: Empire, list Dec. 28, '99..... 77.65

Norway Phila., list Oct. '84..... 82.65

Union Nut Co.: Tire Bolts..... 77.65

Borers, Tap—

Boron Tap, Ring, with Handle:

Inch..... 1 $\frac{1}{4}$ 1 $\frac{1}{2}$ 1 $\frac{1}{2}$ 2

Per doz. \$1.20 5.00 5.75 7.25

Inch..... 2 $\frac{1}{4}$ 2 $\frac{1}{2}$

Per doz. \$3.65 11.50

Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.65; No. 3, \$2.50 each..... 25c

Boxes, Mitre—

C. E. Jennings & Co..... 25&10%

Langton..... 15&10%

Schut..... 40%

Brackets—

Note.—Most Brackets are sold at net prices.

Common Ball, American..... \$1.15@1.25

Barber's..... 50@10@10@50@10%

Fraz's Genuine Spofford..... 50@10%

Fraz's No. 70 to 120, \$1 to 125, 20 to 240, 24 to 250, 25 to 260, 26 to 270, 27 to 280, 28 to 290, 29 to 300, 30 to 310, 31 to 320, 32 to 330, 33 to 340, 34 to 350, 35 to 360, 36 to 370, 37 to 380, 38 to 390, 39 to 400, 40 to 410, 41 to 420, 42 to 430, 43 to 440, 44 to 450, 45 to 460, 46 to 470, 47 to 480, 48 to 490, 49 to 500, 50 to 510, 51 to 520, 52 to 530, 53 to 540, 54 to 550, 55 to 560, 56 to 570, 57 to 580, 58 to 590, 59 to 600, 60 to 610, 61 to 620, 62 to 630, 63 to 640, 64 to 650, 65 to 660, 66 to 670, 67 to 680, 68 to 690, 69 to 700, 70 to 710, 71 to 720, 72 to 730, 73 to 740, 74 to 750, 75 to 760, 76 to 770, 77 to 780, 78 to 790, 79 to 800, 80 to 810, 81 to 820, 82 to 830, 83 to 840, 84 to 850, 85 to 860, 86 to 870, 87 to 880, 88 to 890, 89 to 900, 90 to 910, 91 to 920, 92 to 930, 93 to 940, 94 to 950, 95 to 960, 96 to 970, 97 to 980, 98 to 990, 99 to 1000, 100 to 1010, 101 to 1020, 102 to 1030, 103 to 1040, 104 to 1050, 105 to 1060, 106 to 1070, 107 to 1080, 108 to 1090, 109 to 1100, 110 to 1110, 111 to 1120, 112 to 1130, 113 to 1140, 114 to 1150, 115

Cartridges—

Blank Cartridges:	
.30 C. F., \$6.50.....	40¢ 5%
.30 C. F., \$7.00.....	40¢ 5%
.22 cal. Rim, \$1.50.....	10¢ 5%
.32 cal. Rim, \$2.75.....	10¢ 5%
B. B. Caps, Con. Ball Sngd.....	\$1.91
B. B. Caps, Round Ball.....	\$1.49
Central Fire.....	15¢ 5%
Target and Sporting Rifle.....	15¢ 5%
Primed Shells and Bullets.....	10¢ 10%
Rim Fire Sporting.....	50¢
Rim Fire Military.....	15¢ 5%

Casters—

Bed.....	70¢ @ 10¢
Plate.....	60¢ @ 6¢ 5%
Philadelphia.....	75¢ @ 7¢ 10%
Boss.....	70¢ 10%
Boss Anti-Friction.....	70¢ 10%
Martin's Patent (Phoenix).....	45¢
Standard Ball Bearing.....	45¢
Tucker's Patent low list.....	30¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coll.—

American Coll, Jobbers' Shipments:

3-16 1/4 5-16 9/16 7-16 15/16 9-16

8-50 6-50 4-50 3-50 3-70 3-65

3-50 3-50 1 to 1 1/4 inch

3-60 3-50 3-50 3-40 per 100 lb.

German Coll.....

60¢ @ 10¢ 10%

Halters and Ties—

Halter Chains.....

60¢ @ 10¢ @ 80¢ @ 10¢ 10¢ 10%

German Halter Chains, list July 24,

97¢.....

60¢ @ 10¢ @ 80¢ @ 10¢ 10¢ 10%

Cow Ties.....

50¢ @ 10¢ @ 60¢

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair

6 1/2-6-3, Straight, with ring.....\$30.00

6 1/2-6-2, Straight, with ring.....\$31.00

6 1/2-8-2, Straight, with ring.....\$34.00

6 1/2-10-2, Straight, with ring.....\$39.00

Add 2¢ per pair for Hooks.

Twist Traces 2¢ per pair higher than

Straight Link.

Trace, Wagon and Fancy Chains.

50¢ @ 10¢ @ 50¢ @ 10¢ 10¢ 10%

Miscellaneous—

Jack Chain, list July 10, '93:

Iron.....60¢ @ 10¢ @ 80¢ @ 10¢ 10¢ 10%

Brass.....60¢ @ 10¢ @ 80¢ @ 10¢ 10¢ 10%

Safety Chain.....70¢ @ 10¢ @ 75¢ 10¢ 10%

Gal. Pump Chain.....10. 4¢ @ 4¢

Covert Mfg. Co.

Breast.....40¢ 25%

Halter.....40¢ 25%

Heel.....40¢ 25%

Stallion.....40¢ 25%

Covert Sad. Works:

Breast.....20¢

Halter.....20¢

Hold Back.....20¢

Rein.....20¢

Oneida Community:

Am. Coll and Halters.....40¢ @ 45¢ 5%

Am. Cow Ties.....45¢ @ 50%

Eureka Coll and Halter.....45¢ @ 50¢ 5%

Niagara Coll and Halter.....45¢ @ 50¢ 5%

Niagara Cow Ties.....45¢ @ 50¢ 10¢ 8¢ 5%

Wire Dog Chains.....45¢ @ 50¢ 5%

Wire Goods Co.:

Dog Chain.....70¢ 10%

Universal Dog-Jointed Chain.....50¢

Chalk—(From Jobbers)

Carpenters' Blue.....gro. 40¢ @ 15¢

Carpenters', Red.....gro. 35¢ @ 15¢

Carpenters', White.....gro. 30¢ @ 35¢

See also Crayons.

Checks, Door—

Bardely's.....40¢ & 10¢

Columbia.....50¢ & 10¢

Eclipse.....60¢

Chests, Tool—

American Tool Chest Co.:

Boys' Chests, with Tools.....55¢

Youth's Chests, with Tools.....40¢

Gentlemen's Chests, with Tools.....30¢

Farmers', Carpenters' etc., Chests, with Tools.....20¢

Machinists and Fip: Fliters' Chests, Empty.....50¢

C. E. Jennings & Co. Machinists' Tool Ch.-sts.....33¢ & 10¢

Chisels—

Socket Framing and Firmer Standard List—

70¢ @ 7¢ 10¢ 10%

Buck Bros.....30¢

Charles Buck.....30¢

C. E. Jennings & Co. Nos. 101, 181

16¢ & 10¢

L. & J. L. White, Tanged.....35¢ 5%

Cold—

Cold Chisels, good quality, lb. 13@15¢

Cold Chisels, fair quality, lb. 11@12¢

Cold Chisels, ordinary.....lb. 8@9¢

Chucks—

Beach Fps, each 88.00.....35¢ 5%

Pratt's Positive Drive.....25¢

Empire.....25¢

Blacksmiths'—

Skinner's Patent Chuck—

Combination Lathe Chucks.....40¢

Drill Chucks, Standard and Special.....30¢

Independent Lathe Chucks.....25¢

Improved Planer Chucks.....25¢

Universal Lathe Chucks.....40¢

Face Plate Jaws.....40¢

Standard Tool Co.

Improved Drill Chuck.....45¢

Union Mfg. Co.:

Combination.....40¢

Cax Drill.....30¢

Geared Scroll.....30¢

Independent.....40¢

Union Drill.....30¢

Universal.....40¢

Face Plate Jaws.....35¢

Wescott Patent Chucks:

Lathe Chucks.....50¢

Cartridges—

Blank Cartridges:	40¢ 5%
.30 C. F., \$6.50.....	40¢ 5%
.30 C. F., \$7.00.....	40¢ 5%
.22 cal. Rim, \$1.50.....	10¢ 5%
.32 cal. Rim, \$2.75.....	10¢ 5%
B. B. Caps, Con. Ball Sngd.....	\$1.91
B. B. Caps, Round Ball.....	\$1.49
Central Fire.....	15¢ 5%
Target and Sporting Rifle.....	15¢ 5%
Primed Shells and Bullets.....	10¢ 10%
Rim Fire Sporting.....	50¢
Rim Fire Military.....	15¢ 5%

Casters—

Adjustable, Hammers'.....	20¢ @ 20¢ 5%
Cabinet Sargent's.....	50¢ @ 10¢
Carriage Makers', P. S. & W. Co.	50¢
Carriage Makers' Sargent's.....	60¢
Heavy, Parallel.....	33¢ @ 10¢
Linenman's, Utica Drop Forge & Tool Co.	40¢
Saw Clamps, see Vises, Saw Plates.	

Cleavers, Drain—

Iwan's Champion, Adjustable.....	55¢
Iwan's Champion, Stationary.....	40¢

Cleat Walk—

Star Socket, All Steel.....	\$4.05 net
Star Shank, All Steel.....	\$4.05 net
N. & C. Shank, All steel, 7½ in. P. d. 12, \$8.05; 8 in., \$8.10; 8½ in., \$8.25	

Cleavers, Butchers'—

Foster Bros.	90¢
New Haven Edge Tool Co.'s.....	45¢
Payette R. Plumb.....	33¢ @ 33¢ @ 10¢ @ 10¢
P. S. & W.	50¢ @ 50¢ @ 50¢

Clippers—

Chicago Flexible Shaft Company.....	
9¢ Chicago Horse.....	85¢ 75¢
1902 Chicago Horse.....	810¢ 75¢
Lightning Belt.....	815.00
Chicago Belt.....	820.00
Stewart's Patent Sheep.....	813.50

Clips Axle—

Eagle and Superior 4¢ and 5¢.....	5¢ 10¢
inch.....	70¢ 10¢ 10%

Cloth and Netting, Wire—

—See Wire, &c.	
Cocks, Brass—	
Hardware list:	

Compressors Dividers, &c.—

Ordinary Goods.....	75¢ @ 75¢ 5%
Bemis & Call Hdw. & Tool Co.:	
Dividers.....	65¢

Compressors Dividers, &c.—

J. B. Hughes' 2¢ doz.....	82.50
doz.....	82.50
doz.....	82.50

Conductor Pipe, Calv.—

L. C. L. to Dealers:	
Nested.....	Not nested.
Eastern.....	75¢ 77¢ 5%
Central.....	75¢ 72¢ 5%
Southern.....	70¢ 71¢ 5%
Western.....	65¢ 61¢ 10¢ 10%

Compressors Corn Shock—

J. B. Hughes' 1¢ doz.....	82.50
doz.....	82.50
doz.....	82.50

Coolers, Water—

Gal. each.....	3 4 6 8
Labrador.....	1.20 \$1.50 \$1.80 \$2.10
Gal. each.....	3 4 6 8
Ice Land, ea. \$1.80 \$2.10 \$2.40 \$3.00	
Gal. each.....	3 4 6 8
Gav. Lined Ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00	
Gav. Lined Ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00	

Coolers, Water—

See Tools, Coolers.	
Cord—	
Sash—	

Gates, Molasses and Oil		Sarn Door, New England Pattern
Stebbins' Pattern.....	\$80 & \$10	Check Back Regular: 3 4 5 6 Inch \$1.10 1.00 2.15 2.70
Gauges		Single Doz. \$1.10
Marking, Mortise, &c.	50¢ & 10¢ & 50¢ & 10¢	Allith Mfg. Co. per doz. \$15.00
Fulton's Butt Gauge.	3¢ & 10¢	Chicago, Spring Butt Co.: Fretlon 25¢ Oscillating 25¢ Big Twin 25¢
Stanley R. & L. Co.'s Butt & Babbet Gauge.	20¢ & 20¢ & 10¢ & 10¢	Chisholm & Moore Mfg. Co.: Baggage Car Door. 50¢ Elevator. 40¢ Railroad. 55¢
Wire, Brown & Sharpe's.	25¢	Cronk & Carrier Mfg. Co.: Loose Axle. 60¢ Roller Bearing. 60¢ & 10¢
Wire, Morse's.	25¢	Lane Bros., Co.: Parlor, Ball Bearing. 94.15 Parlor, Standard. 93.45 Parlor, New Model. 93.45 Parlor New Champion. 92.25
Wire, P. S. & W. Co.	30¢ & 10¢	Barn Door, Standard. 50¢ & 10¢ & 5¢ Covered. 50¢ & 10¢ & 10¢ Spec. 50¢ & 10¢ & 10¢ & 5¢
Clinlets—Single Cut		Lawrence Bros.: Advance. 60¢ Cleveland. 60¢ & 10¢ Crown. 60¢ Giant. 5¢ & 10¢ New York. 60¢ Peerless. 60¢ & 10¢ Sterling. 60¢ Swing. 60¢ & 10¢ Union. 60¢ & 10¢: No. 45. 7.00: No. 46. 89.00
Nail, Metal, Assorted, gro. \$1.10 @ 1.80		McKinney Mfg. Co.: No. 1, Special. 60¢ & 10¢ No. 2, Standard. 60¢ & 10¢ Hinged Hangers, \$1.00. 50¢
Spike, Metal, Assorted, gro. \$2.80 @ 3.25		Meyers' Stayon Hangers 5¢ & 10¢ (net)
Nail, Wood Handled, Assorted, gro. \$1.75 @ 2.00		E. S. Smith Mfg. Co.: Lundy Parlor Door. 50¢ & 10¢ Monarch Barn Door. 60¢ & 10¢ Never Jump Hinge. 5¢ & 10¢ Peerless. 60¢ & 10¢ Perfection. 70¢ & 5¢ Phoenix. 70¢ & 5¢ Wagner's Adjustable. 70¢ & 10¢ Warehouse Anti-Friction.00¢
Spike, Wood Handled, Assorted, gro. \$3.25 @ 3.50		Stowell Mfg. & Foundry Co.: Acme Parlor Ball Bearing. 40¢ Atlas. 60¢ Badger Barn Door. 50¢ Baggage Car Door. 50¢ Climax Anti-Friction. 50¢ Elevator. 40¢ Express. 30¢ Interstate. 60¢ Lundy Parlor Door. 50¢ Magic. 50¢ Matchless. 60¢ Nansen. 60¢ & 10¢ Railroad. 50¢ Street Car Door. 50¢ Steel, Nos. 300, 404, 500. 40¢ & 15¢ Swivel Parlor Door. 50¢ Wild West, Nos. 301, 404, 500. 50¢ Zenith for Wood Track. 50¢
Glue—Liquid, Fish—		A. J. Swett Iron Works: Eagle. 60¢ & 10¢ Hawk. 50¢ & 10¢ Perfection. 60¢ Pilot. 60¢
List A, Bottles or Cans, with Brush.	37¢ & 50¢	Taylor & Boggs by Co.: 50¢ & 15¢ & 10¢ & 5¢
List B, Cans (4 pts., pts., qts.) 33¢ & 45¢		Wilcox Mfg. Co.: Bike Roller Bearing. 60¢ & 10¢ C. J. Roller Bearing. 60¢ & 10¢ Cycle Ball Bearing.00¢ Dwarf Ball Bearing. 40¢ Ives, Wood Track. 60¢ & 10¢ L. T. Roller Bearing. 60¢ & 10¢ & 5¢ New Era Roller Bearing. 50¢ & 10¢ O. K. Roller Bearing. 60¢ & 10¢ & 5¢ Prindle, Wood Track. 60¢ Richards' Wood Track. 60¢ Richards' Steel Track. 50¢ & 10¢ Spencer Roller Bearing. 6¢ & 10¢ Tandem Nos. 1 and 2. 60¢ Underwriters' Roller Bearing. 40¢ Velvet. 50¢
List C, Cans (4 gal., gal.) 25¢ & 45¢		Wilcox Auditorium Ball Bearing. 20¢ Wilcox Barn Trolley No. 123. 45¢ Wilcox Elevator Door Hangers, Nos. 112 and 124. 5¢ Wilcox Elevator Door Hangers, No. 132. 10¢ Wilcox Fire Trolley, Roller Bearing. 10¢ Wilcox Le Roy Noiseless Ball Bearing. 40¢ Wilcox New Century. 50¢ & 10¢ & 10¢ Wilcox O. K. Steel Track. 50¢ Wilcox O. K. Trolley. 50¢ Wilcox Trolley Ball Bearing. 40¢ Wilcox Wideman Narrow Gauge Ball Bearing. 40¢
International Glue Co. (Martin's)	40¢ & 10¢ & 50¢	For Track, see Rail.
Grease, Axe—		
Common Grade. gro. \$5.00 @ 6.00		
Dixon's Everlasting. 10¢ & pails, ea. \$5¢		
Dixon's Everlasting, in bx. \$2.00: No. 1 lb. \$1.20; 2 lb \$2.00		
Griddles, Soapstone—		Extra Scales 10¢ to 10¢ by 10¢.
Pike Mfg. Co.	33¢ & 33½ & 10%	
Grindstones—		
Bicycle Emery Grindler.	86.50	
Bicycle Grindstones, each.	\$3.50 & \$3.00	
Pike Mfg. Co.: Improved Family Grindstones, per inch, per doz. \$2.00 (33½¢)		
Pike Mowee Knife and Tool Grinder, each. \$3.00		
Velox Ball Bearing, mounted, Angle Iron Frames. each, \$3.25		
Guards Snow—		
Cleveland Wire Spring Co.: Galv. Steel 1/1000. \$9.00		
Copper 1/1000. \$18.00		
Halters and Ties—		
Covert Mfg. Co.: Web. 45¢ & 25¢		
Jute Rope. 40¢ & 5¢ & 25¢		
Sisal Rope. 20¢ & 25¢		
Covert's Saddlery Works: Web and Leather Halters. 70¢		
Jute and Manila Rope halters. 70¢		
Sisal Rope Halters. 60¢ & 20¢		
Jute, Manila and Cotton Rope Ties. 70¢		
Sisal Rope Ties. 60¢ & 10¢		
Hammers—		
Handled Hammers—		
Beller's Machinists'. 40 & 10¢ & 40 & 10¢ & 10¢		
Beller's Farriers'. 40 & 10¢ & 40 & 10¢ & 10¢		
Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50, \$1.75. 40¢ & 40¢ & 10¢ & 10¢		
Peck, Stow & Wilcox. 50¢		
Fayette et. Plumb:		
Plumb, A. E. Nall. 33½¢ & 7½¢ (33½¢ & 10¢ & 7½¢)		
Engineers' and B. S. Hand.		
30¢ & 7½¢ & 5¢ & 10¢ & 10¢ & 7½¢ & 5¢		
Machinists' Hammers. 50¢ & 50¢ & 10¢ & 5¢		
Riveting and Tummers. 40 & 25¢ @ 40¢ & 10¢ & 25¢		
Sargent's C. S. New List. 40¢ & 10¢		
Heavy Hammers and Sledges—		
2 lb. and under. lb. 4½ c. 75¢ & 5¢ & 75¢		
3 to 5 lb. lb. 3½ c. 45¢ & 25¢ & 10¢		
Over 5 lb. lb. 3½ c. 45¢ & 25¢ & 10¢		
Wilkinson's Smities. 9½¢ @ 10¢ lb.		
Handles—		
Agricultural Tool Handles—		
Axe, Pick, &c. 5¢ & 10¢ & 25¢		
Hoe, Lake, &c. 60¢ & 60¢ & 5¢		
Fork, Shovel, Spade, &c.		
Long Handles. 60¢		
D Handles. 50¢		
Cross-Cut Saw Handles—		
Atkins'. 40 & 25¢		
Champion. 45¢ & 45¢ & 10¢		
Diastow'. 50¢		
Mechanics' Tool Handles—		
Auger, assorted. gro. \$2.30 @ \$2.50		
Bread Axle. gro. \$4.50 @ \$5.00		
Cheisel Handles: Apple Tanged Firmer, gro. ass'd. \$2.25 @ \$2.55; large, \$2.50 @ \$2.60		
Hickory Tanged Firmer, gro. ass'd. \$1.75 @ \$2.20; large, \$2.50 @ \$3.70		
Apple Socket Firmer, gro. ass'd. \$1.70 @ \$1.85; large, \$2.00 @ \$2.25		
Hickory Socket Firmer, gro. ass'd. \$1.60 @ \$1.75; large, \$1.75 @ \$2.00		
Hickory Socket Framing, gro. ass'd. \$2.50 @ \$2.75; large, \$2.65 @ \$2.85		
File, assorted. gro. \$1.00 @ \$1.15		
Hammer, Hatchet, Axe, &c. 50¢		
Hand Saw, Farnished, doz. 70 @ 7½¢		
Not Varnished. 55¢ @ 80¢		
Plane Handles: Jack, doz. 35¢; Jack Bolted. 55¢ @ 60¢		
For, doz. 35¢ @ 38¢; For, Bolted. 70¢ @ 75¢		
Miller's Falls Adj. and Ratchet Aug'r Handles. 15¢ & 10¢		
Nicholson Simplicity File Handle, P gro. \$0.85 @ \$1.50		
Hangers—		
Barn Door, New Pattern, Round Groove, Regular:		
Inch. 3 4 5 6 8		
Single Doz. \$0.85 1.30 1.50 1.90 2.30		
Gates, Molasses and Oil—		
Stebbins' Pattern.....	\$80 & \$10	
Gauges—		
Marking, Mortise, &c.	50¢ & 10¢ & 50¢ & 10¢	
Fulton's Butt Gauge.	3¢ & 10¢	
Stanley R. & L. Co.'s Butt & Babbet Gauge.	20¢ & 20¢ & 10¢ & 10¢	
Wire, Brown & Sharpe's.	25¢	
Wire, Morse's.	25¢	
Wire, P. S. & W. Co.	30¢ & 10¢	
Clinlets—Single Cut		
Nail, Metal, Assorted, gro. \$1.10 @ 1.80		
Spike, Metal, Assorted, gro. \$2.80 @ 3.25		
Nail, Wood Handled, Assorted, gro. \$1.75 @ 2.00		
Spike, Wood Handled, Assorted, gro. \$3.25 @ 3.50		
Glass American Window		
Jobbers' List, Dec. 16, 1902.		
From store, Single and Double 90¢ & 10%		
By O. B. factory, carload lots:		
Single and Double. 50¢ & 10¢ & 2½¢		
2000 box lots. 90¢ & 25¢		
Clue—Liquid, Fish—		
List A, Bottles or Cans, with Brush.	37¢ & 50¢	
List B, Cans (4 pts., pts., qts.) 33¢ & 45¢		
List C, Cans (4 gal., gal.) 25¢ & 45¢		
International Glue Co. (Martin's)	40¢ & 10¢ & 50¢	
Grease, Axe—		
Common Grade. gro. \$5.00 @ 6.00		
Dixon's Everlasting. 10¢ & pails, ea. \$5¢		
Dixon's Everlasting, in bx. \$2.00: No. 1 lb. \$1.20; 2 lb \$2.00		
Griddles, Soapstone—		
Pike Mfg. Co.	33¢ & 33½ & 10%	
Grindstones—		
Bicycle Emery Grindler.	86.50	
Bicycle Grindstones, each.	\$3.50 & \$3.00	
Pike Mfg. Co.: Improved Family Grindstones, per inch, per doz. \$2.00 (33½¢)		
Pike Mowee Knife and Tool Grinder, each. \$3.00		
Velox Ball Bearing, mounted, Angle Iron Frames. each, \$3.25		
Guards Snow—		
Cleveland Wire Spring Co.: Galv. Steel 1/1000. \$9.00		
Copper 1/1000. \$18.00		
Halters and Ties—		
Covert Mfg. Co.: Web. 45¢ & 25¢		
Jute Rope. 40¢ & 5¢ & 25¢		
Sisal Rope. 20¢ & 25¢		
Covert's Saddlery Works: Web and Leather Halters. 70¢		
Jute and Manila Rope halters. 70¢		
Sisal Rope Halters. 60¢ & 20¢		
Jute, Manila and Cotton Rope Ties. 70¢		
Sisal Rope Ties. 60¢ & 10¢		
Hammers—		
Handled Hammers—		
Beller's Machinists'. 40 & 10¢ & 40 & 10¢ & 10¢		
Beller's Farriers'. 40 & 10¢ & 40 & 10¢ & 10¢		
Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50, \$1.75. 40¢ & 40¢ & 10¢ & 10¢		
Peck, Stow & Wilcox. 50¢		
Fayette et. Plumb:		
Plumb, A. E. Nall. 33½¢ & 7½¢ (33½¢ & 10¢ & 7½¢)		
Engineers' and B. S. Hand.		
30¢ & 7½¢ & 5¢ & 10¢ & 10¢ & 7½¢ & 5¢		
Machinists' Hammers. 50¢ & 50¢ & 10¢ & 5¢		
Riveting and Tummers. 40 & 25¢ @ 40¢ & 10¢ & 25¢		
Sargent's C. S. New List. 40¢ & 10¢		
Heavy Hammers and Sledges—		
2 lb. and under. lb. 4½ c. 75¢ & 5¢ & 75¢		
3 to 5 lb. lb. 3½ c. 45¢ & 25¢ & 10¢		
Over 5 lb. lb. 3½ c. 45¢ & 25¢ & 10¢		
Wilkinson's Smities. 9½¢ @ 10¢ lb.		
Handles—		
Agricultural Tool Handles—		
Axe, Pick, &c. 5¢ & 10¢ & 25¢		
Hoe, Lake, &c. 60¢ & 60¢ & 5¢		
Fork, Shovel, Spade, &c.		
Long Handles. 60¢		
D Handles. 50¢		
Cross-Cut Saw Handles—		
Atkins'. 40 & 25¢		
Champion. 45¢ & 45¢ & 10¢		
Diastow'. 50¢		
Mechanics' Tool Handles—		
Auger, assorted. gro. \$2.30 @ \$2.50		
Bread Axle. gro. \$4.50 @ \$5.00		
Cheisel Handles: Apple Tanged Firmer, gro. ass'd. \$2.25 @ \$2.55; large, \$2.50 @ \$2.60		
Hickory Tanged Firmer, gro. ass'd. \$1.75 @ \$2.20; large, \$2.50 @ \$3.70		
Apple Socket Firmer, gro. ass'd. \$1.70 @ \$1.85; large, \$2.00 @ \$2.25		
Hickory Socket Firmer, gro. ass'd. \$1.60 @ \$1.75; large, \$1.75 @ \$2.00		
Hickory Socket Framing, gro. ass'd. \$2.50 @ \$2.75; large, \$2.65 @ \$2.85		
File, assorted. gro. \$1.00 @ \$1.15		
Hammer, Hatchet, Axe, &c. 50¢		
Hand Saw, Farnished, doz. 70 @ 7½¢		
Not Varnished. 55¢ @ 80¢		
Plane Handles: Jack, doz. 35¢; Jack Bolted. 55¢ @ 60¢		
For, doz. 35¢ @ 38¢; For, Bolted. 70¢ @ 75¢		
Miller's Falls Adj. and Ratchet Aug'r Handles. 15¢ & 10¢		
Nicholson Simplicity File Handle, P gro. \$0.85 @ \$1.50		
Hangers—		
Barn Door, New Pattern, Round Groove, Regular:		
Inch. 3 4 5 6 8		
Single Doz. \$0.85 1.30 1.50 1.90 2.30		
Gates, Molasses and Oil—		
Stebbins' Pattern.....	\$80 & \$10	
Gauges—		
Marking, Mortise, &c.	50¢ & 10¢	
Fulton's Butt Gauge.	3¢ & 10¢	
Stanley R. & L. Co.'s Butt & Babbet Gauge.	20¢ & 20¢ & 10¢ & 10¢	
Wire, Brown & Sharpe's.	25¢	
Wire, Morse's.	25¢	
Wire, P. S. & W. Co.	30¢ & 10¢	
Clinlets—Single Cut		
Nail, Metal, Assorted, gro. \$1.10 @ 1.80		
Spike, Metal, Assorted, gro. \$2.80 @ 3.25		
Nail, Wood Handled, Assorted, gro. \$1.75 @ 2.00		
Spike, Wood Handled, Assorted, gro. \$3.25 @ 3.50		
Glass American Window		
Jobbers' List, Dec. 16, 1902.		
From store, Single and Double 90¢ & 10%		
By O. B. factory, carload lots:		
Single and Double. 50¢ & 10¢ & 2½¢		
2000 box lots. 90¢ & 25¢		
Clue—Liquid, Fish—		
List A, Bottles or Cans, with Brush.	37¢ & 50¢	
List B, Cans (4 pts., pts., qts.) 33¢ & 45¢		
List C, Cans (4 gal., gal.) 25¢ & 45¢		
International Glue Co. (Martin's)	40¢ & 10¢ & 50¢	
Grease, Axe—		
Common Grade. gro. \$5.00 @ 6.00		
Dixon's Everlasting. 10¢ & pails, ea. \$5¢		
Dixon's Everlasting, in bx. \$2.00: No. 1 lb. \$1.20; 2 lb \$2.00		
Griddles, Soapstone—		
Pike Mfg. Co.	33¢ & 33½ & 10%	
Grindstones—		
Bicycle Emery Grindler.	86.50	
Bicycle Grindstones, each.	\$3.50 & \$3.00	
Pike Mfg. Co.: Improved Family Grindstones, per inch, per doz. \$2.00 (33½¢)		
Pike Mowee Knife and Tool Grinder, each. \$3.00		
Velox Ball Bearing, mounted, Angle Iron Frames. each, \$3.25		
Guards Snow—		
Cleveland Wire Spring Co.: Galv. Steel 1/1000. \$9.00		
Copper 1/1000. \$18.00		
Halters and Ties—		
Covert Mfg. Co.: Web. 45¢ & 25¢		
Jute Rope. 40¢ & 5¢ & 25¢		
Sisal Rope. 20¢ & 25¢		
Covert's Saddlery Works: Web and Leather Halters. 70¢		
Jute and Manila Rope halters. 70¢		
Sisal Rope Halters. 60¢ & 20¢		
Jute, Manila and Cotton Rope Ties. 70¢		
Sisal Rope Ties. 60¢ & 10¢		
Hammers—		
Handled Hammers—		
Beller's Machinists'. 40 & 10¢ & 40 & 10¢ & 10¢		
Beller's Farriers'. 40 & 10¢ & 40 & 10¢ & 10¢		
Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50, \$1.75. 40¢ & 40¢ & 10¢ & 10¢		
Peck, Stow & Wilcox. 50¢		
Fayette et. Plumb:		
Plumb, A. E. Nall. 33½¢ & 7½¢ (33½¢ & 10¢ & 7½¢)		
Engineers' and B. S. Hand.		
30¢ & 7½¢ & 5¢ & 10¢ & 10¢ & 7½¢ & 5¢		
Machinists' Hammers. 50¢ & 50¢ & 10¢ & 5¢		
Riveting and Tummers. 40 & 25¢ @ 40¢ & 10¢ & 25¢		
Sargent's C. S. New List. 40¢ & 10¢		
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2000 box lots. 90¢ & 25¢		
Clue—Liquid, Fish—		
List A, Bottles or Cans, with Brush.	37¢ & 50¢	

Acme, Lull & Porter.....	75c
Queen City Reversible.....	75c
Stenger's Positive Locking, Nos. 1 & 3.....	75c 10%
Shepard's Noiseless, Nos. 60, 65, 55.....	70c 10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....	75c
1898 Old Pat'n, Nos. 1, 3 & 5.....	75c
Tip Pat'n, Nos. 1, 3 & 5.....	75c
Bullock Gravity Locking, Nos. 1, 3 & 5.....	75c
Shepard's Double Locking, Nos. 2 & 25.....	75c
Champion Gravity Locking, No. 75.....	75c
Steamboat Gravity Locking, No. 10.....	75c
Pioneer, Nos. 600, 45 & 55.....	75c
Empire, Nos. 101 & 103.....	75c
W. H. Co.'s Mortise Gravity Locking, No. 2.....	90c
Gate Hinges—	
Clark's or Shepard's—Doz, sets, No.	1 2 3
Hinges with Latches.....	\$2.00 2.75 5.00
Hinges only.....	\$1.40 2.05 3.80
Latches only.....	.70 .70 .35
New England:	
With Latch.....	doz. @ \$2.50
Without Latch.....	doz. @ \$1.80
Reversible Self-Closing:	
With Latch.....	doz. @ \$1.90
Without Latch.....	doz. @ \$1.45
Western:	
With Latch.....	doz. \$1.80
Without Latch.....	doz. \$1.30
Raleighville Hdware Co.:	
Shepard's or Clark's, doz, sets, No.	1 2 3
Hinges with Latches.....	\$2.00 2.70 5.00
Hinges only.....	1.40 2.05 3.80
Latches only.....	.70 .70 .35
Spring Hinges—	
Holdback, Cast Iron, gro. 8", 10", 12", 15", Non-Holdback, Cast Iron gro. \$7 @ 7.50	
J. Bardsley	
Bardsley's Patent Checking.....	15c
Bommer Bros.:	
Bommer Ball Bring Floor Hinges.....	40c
Bommer Spring Hinges.....	40c
Chicago Spring Butt Co.:	
Chicago Sprng'g Inzes.....	25c
Triple End Suring Hinges.....	50c
Chicago (Ball Bearing) Floor Hinge.....	45c
Garden City Engine House.....	25c
Keene's Saloon 1 Door.....	25c
Columbian Hdw. Co.:	
Aeme, Wrt, Steel.....	30c
Acme Brass.....	20c
American.....	30c
Columbia, No. 14.....	per gr. 30c
Columbia, No. 18.....	per gr. \$25.00
Columbia, Adjustable, No. 7.....	per gr. \$12.00
Gem, new list.....	30c
Clover Leaf.....	per gr. \$12.50
Oxford, new list.....	30c
Hoffman Hinge & Foundry Co.:	
No. 70 & no Holdback Detachable@ 9.50	
Lawson Mfg. Co.:	
Marchi ss.....	35c
Matchless Pivot.....	45c
Selby Spring Hinge Co.:	
Crown Jamb Hinge.....	40c
Chief Ball Bearing Floor Hinge, 45c	
Royal Ball Bearing Floor Hinge, 45c	
The Stover Mfg. Co.:	
Ideal, No. 16, Detachable, per gr. \$2.50	
Ideal, No. 4.....	per gr. \$9.00
New Ideal No. 1.....	per gr. \$9.00
New Idea, Double Acting.....	45c
Extra 10c often given on most of these hinges.	
Wrought Iron Hinges—	
Strap and T Hinges, &c., list Mar. 15, 1901:	
Light Strap Hinges.....	75c
Heavy Strap Hinges.....	75c 10%
Light T Hinges.....	60c
Heavy T Hinges.....	60c 10%
Extra Heavy T Hinges.....	55c
Hinge Hasps.....	55c
Cor. Heavy Strap.....	75c 10%
Cor. Ex. Heavy T.....	75c
Screw Hook, { 6 to 12 in.....	lb. 31c
and Strap, { 14 to 20 in.....	lb. 34c
{ 22 to 36 in.....	lb. 3
Screw Hook and Eye:	
3/4 to 1 inch.....	lb. 5
5/8 inch.....	lb. 6
1/2 inch.....	lb. 7
Miscellaneous—	
Hoffman's Steel Spring Butt Hinges.....	40c & 10c
Hoffman's Offset Refrigerator Hinges.....	40c & 10c
Hitchers, Stall —	
Covert Mfg. Co., Stall Hitchers,	35c
Hods Coal—	
15, 16, 17, 18 inch.	
Galv. Open, \$2.50 2.75 3.00 3.25 per doz	
Jap. Open, \$3.00 2.25 2.50 2.75 per doz	
Galv. Funnel, \$3.00 3.25 3.50 3.75 per doz	
Jap. Funnel, \$2.50 2.75 3.00 3.25 per doz	
Masons, Etc.—	
Cleveland Wire Spring Co.:	
Steel Mortar.....	each \$1.40
Steel Brick.....	each \$1.10
Hoffman's:	
Brick.....	each \$1.10
Masons'	each \$2.00
Plasterers'	each \$2.00
Hoes—Eye—	
Scovil and Oval Pattern, 60c & 10@ 60c 10c & 10c	
Grub, list Feb. 23, 1899.....	70c to 10c
Handled—	
Aug. 1, 1899, List:	
Garden.....	70c 10%
Meadow & Rhode Island.....	75c 10%
Southern Meadow.....	75c 50c 10%
Mortar and Street.....	75c 75c
Planters', Regular Fat.....	70c & 80c
Cotton.....	75c 10%
Toy, Ladies', Boys', Onion, Turnip, Berry or Tobacco, 70c and 55c	
Note.—Manufacturers and Jobbers have a diversity of lists, and often sell at next prices.	
Ft. Madison Cotton Hoe.....	75c & 75c
Ft. Madison Crescent Cultivator Hoe, per doz.....	75c & 10c
Ft. Madison Mattock Hoes:	
Regular Weight.....	per doz. \$5.00
Junior Size.....	per doz. \$4.00

St. Madison Sprouting Hoe, # doz.	\$4 60
St. Madison Dixie Tobacco Hoe.	75 & 90
Kretser's Cut Easy.	70 & 10
Warren Hoe.	60
W. & C. Ivanhoe.	75 & 25
B. B. Cultivator Hoe.	75 & 10 & 25
Acme Weeding.	75 & 10 & 25
W. & C. Lightning Shovel Hoe, # doz.	\$4.85
Hoisting Apparatus—	
See Machines, Hoisting.	
Holders— Bit—	
Angular, # doz.	\$24.00..... 45&10
Door—	
Empire.	50
File and Tool—	
Nicholson's File Holders and File Handles.	33&45
Hooks— Cast Iron—	
Bird Cage, Reading.	60
Bird Cage, Sargent's List.	60
Ceiling, Sargent's List.	40&10
Clothes Line, Hoffmann's.	40&10
Clothes Line, Reading List	65&10&10/65&10&10
Clothes Line, Sargent's List.	55&20&10
Coat and Hat, Sargent's List.	45
Clothes Line, Stowell's.	70
Coat and Hat, Stowell's.	70
Coat and Hat, Reading.	70/75
Coat and Hat, Wrightsville.	65
Harness, Hoffman.	per oz. 35&40
Harness, Reading List.	70&10/75
Wire—	
Belt.	50
Wire C. & H. Hooks, #doz 10@60c 100@5	
Atlas, Coat and Hat:	
Single Circle.	50
10 Case Harness.	50/10
Czar Harness.	50&10&5
Wire Coat and Hat:	
Acme.	60
B. B.	60
V brace, Chief and Czar.	60
Gem.	60
Bright Wire Goods—See Wire.	
Wrought Iron—	
Box, 6 in., per doz. \$1.00; 8 in., \$1.25;	
10 in., \$2.50.	
Cotton.	doz. \$1.05@1.25
Wrought Staples, Hooks, &c.	
See Wrought Goods.	
Miscellaneous—	
Bush, Light, doz. 85.50@ Medium,	
\$6.00; Heavy, \$6.50	
Grass.	No. 1 2 3 4
Best.	\$1.50 1 75 2.00
Common.	11.30 1.30 1.60 1.60
Potato and Manure.	68&14
Whiffletree.	10, 50
Hooks and Eyes:	
Brass.	60c 10d 10@70
Malleable Iron.	70c 5@.70c 10
Covert Saddlery Works' Self Locking	
Gate and Door Hook.	60
Ft. Madison Cut-Easy Corn Hooks.	
Crown Picture.	# doz. \$5.35 net
Bench Hooks—See Bench Stops.	
Corn Hooks—See Knives, Corn.	
Horse Nails—See Nails, Horse.	
Horseshoes—	
See Shoes, Horse.	
Hose, Rubber—	
Garden Hose, 3/4-inch:	
Competition.	ft. 45@4.50
3-ply Standard.	ft. 6 @ 6.00
4-ply Standard.	ft. 7 1/2@ 6.00
2-ply extra.	ft. 8 1/2@ 9
4-ply extra.	ft. 10 1/2@ 11
Cotton Garden, 3/4-in., coupled:	
Low Grade.	ft. 6 @ 7
Fair quality.	ft. 8 @ 9
Irons— Sad—	
From 4 to 10.	lb. 24@3.00
B. B. Sad Irons.	lb. 3@3.50
Chinese Laundry.	lb. 4 1/2@5.00
Chinese Sud.	lb. 3 1/2@4.00
Mrs. Potts', per set:	
Nos.	50 55 60 65
Jap'd Tops.	.75c 71c 85c 81c
Tin'd Tops.	.77c 74c 87c 84c
New England Pressing, lb.	36@3.50
Plinking—	
Pinking Irons.	doz. 50@60
Soldering—	
Soldering Coppers 2 1/2 and 3.	18@1.00
1 1/2 and 2.	20@2.00
Covert Mfg. Co.	20@2.00
Jacks, Wagon—	
Cover Mfg. Co.:	
Auto Screw.	80&5
Steel.	45&2
Covert's Saddlery Works':	
Daisy.	60&10
Victor.	60&10
Lockport.	50
Lane's Steel.	30&10
Kettles—	
Brass, Span, Plain.	20@25
Enamelled and Cast Iron—See Ware.	
Hollow.	
Knives—	
Butcher, Kitchen, &c.—	
Foster Bros.' Butcher, &c.	30
Hartzell Cutlery Co.	50
Smith & Hemenway Co.	40&10
Hay and Straw—See Hay Knives.	
Corn—	
Withington Acme, # doz.	\$2.65; Dent,
\$2.75; Adj. Serrated, \$2.20; Ser-	ated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.	
Drawing—	
Standard List.	70d5@70d10
Bradley's.	
C. E. Jennings & Co. Nos. 45, 46, 60&10	
Jennings & Griffin, Nos. 51, 52, 60&10@10	
Swan's.	70@108.25
Watrous.	163&10
L. & L. J. White.	20d5@25
Hay and Straw—	
Lightning.	# doz. \$6.50@7.00
Iwan's Sickle Edge.	# doz. \$6.10@
Iwan's Serrated.	# doz. \$6.00
Maine.	# doz. \$8.50

Mincing—
Buffalo, \$ gro. \$13.00
Miscellaneous—
Farriers', doz. \$2.00@3.00
Wostenholm's, \$ doz. \$3.00, 3.25

Knobs—
Base, 2½ inch, Birch, or Maple,
Kubber tip, gro. \$1.10@1.20
Carriage, Jap, all sizes, gro. 55@30c
Door, Mineral, doz. 65@70c
Door, Por. Jap'd, doz. 70@75c
Door, Por. Nickel, doz. \$2.05@2.15
Bardsley's Wood Door, Shutter, &c. 15c
Picture, Sargent's, 60@10c

Lacing Leather—
See Belting Leather—

Ladders Step Etc.—

Lane's Store, 25c
Myers Noisles, Store Ladders, 50c

Ladies— Melting—

L. & G. Mfg. Co., 25c
P. S. & W., 50c
Reading, 60c
Sargent's, 40@10c

Lanterns— Tubular—

Regular Tubular, no. \$4.50@4.75
Lift Tubular, no. 3.7@6.50c
Hinge Tubular, do. \$4.75@6.25c
Other Styles, 50@10c@40c@60c

Bull's Eye Police—

No. 1, 2½ inch, \$3.50@2.75
No. 2, 3 inch, \$2.75@4.00

Latches— Gate—

Hinged & Safety Gat, P. doz. 60c

Thumb—

Roggan's Latches, w. screw. dz \$5@40c

Leaders Cattle—

Small, doz. 55c; large, 60c

Cover Mfg. Co., 35@42c

Lifters, Transom—

R. & S. Mfg. Co., 33@42c

Linen—

Wire Clothes, Nos., 18, 19, 20
100 feet, \$2.20 2.00 1.65
75 feet, \$1.80 1.70 1.30

Ossawan Mills,

Crown Solid Braided Chalk, 33@4c

Mason's, No. 0 to No. 3, 33@4c

Samson Cordage Works:

Solid Braided Chalk, No. 0 to 3, 10c

Silver Lake Braided Chalk, No. \$6.00;

No. 1, \$6.50; No. 2, \$7.00; No. 3, 7.50

40c

Locks— Cabinet—

Cabinet Locks, \$3.50@4.75@6c

Door Locks, Latches, &c.—

[Not prices are very often made on
these goods.]

Reading Hardware Co., 50c

R. & S. Mfg. Co., 40c

Sargent & Co., 40@40@10c

Elevator—

Stowell's, 40c

Padlocks—

Wrought Iron, 7@10@12@15@18c

R. & E. Mfg. Co. Wrt. Steel and Brass, 75@10@15c

Sash, &c.—

Ives' Patent, Bronze and Brass, 55@7.5c

Crescent, 50c

Iron, 50c@2.5c

Wrought Bronze and Brass, 50c@2.5c

Wrought Steel, 55c

Reading, 60@10@10@70%

Machines— Boring—

Com., Upright, Without Augers, \$2.00

Com., Angular, Without Augers, \$2.25

Without Augers, R. & E. Mfg. Co.: Upright, Angular, No. 3, 4.25; No. 4, 5.00

Improved No. 4, 6.75 No. 2, 3.38

Improved No. 5, 7.75

Jennings', No. 4, 3.15 No. 1, 3.50

Miller's Fails, 5.75

Snell's, Rice's Pat, 2.50 2.75

Hoisting—

Moore's Anti-Friction Differential Pulley Block, 30c

Moore's Hand Hoist, with lock Brake, 20c

Moore's Portable Pneumatic Hoist, 25c

Ice Cutting—

Chandler's, 15@10c

Mallets—

Hickory, 4.5@5@5c

Lignumvitae, 4.5@5@5c

Tinners', Hickory and Applewood, doz., 50@5c

Mate— Door—

Elastic Steel (W. G. Co.), 10c

Mattocks—

See Picks and Mattocks.

Menders Hose—

Robinson's Hose Menders, P. gro. \$2.00

Milk Cans— See Cans, Milk

Mills— Coffee, etc.—

Enterprise Mfg. Co., 25@30c

Hoffman's Side, Coffee and Spice, P. doz. \$1.25

National, list Jan. 1, 94, 30c

Parker's Columbia & Victoria, 50@10@60c

Parker's Box and Side, 50@10@60c

Swift, Lane Bros. Co., 30c

Mowers Lawn—

Net prices are generally quoted.

Cheap, all sizes, \$1.90@1.95

Good, all sizes, \$2.25@2.50

10 12 14 16-inch

High Grade, 4.25 4.50 4.75 5.00

Continental, 60@10c

Great American, 70c

Great American Ball Bearing, 60@10c

Quaker City, 70c

Pennsylvania, 60@10c

Pennsylvania Ball Bearing, 60@5c

Pennsylvania Golf, 50c

Pennsylvania Horse, 9c

Pennsylvania Pony, 45c

Philadelphia:
Style es h., S., C., K., T. 70@10c
Style A, all steel, 60@10c
Style E, High Wheel, 70@10@10c
Drexel and Gold Coin, low list, 50@5c

Nails—

Cut and Wire. See Trade Report.
Were Nail and Brads, Papered.
List July 20, 1899.

Hungarian, Finishing, Upholsterers, &c., See Tacks.

Horse—

Nos. 6 7 8 9 10

A. C., 25c 23c 22c 21c 20c, 40@5c

C. B. K., 25c 23c 22c 21c 20c, 40@5c

Champion's, 25c 23c 22c 21c 20c, 40@5c

Clinton, 19c 17c 16c 15c 14c@30@10@5c

Maud S., 25c 23c 22c 21c 20c, 50c

Putnam, 23c 21c 20c 19c 18c, 33@4c

Putnam, 11c sq. ft., 2.75@3.00

Col'l Roll'd 19c 18c 17c 16c, 10@10c

American, Nos. 5 to 10 10c, 9c@9c

Neonset, Nos. 5 to 10c, 10c@12c

Jobbers' special brands, per lb. 8@9c

Picture—

1 1/2 2 2 1/2 3 3 1/2 in.

Brass Head, 45 .60 .70 .95 1.00 gro.

Por. Head, 1.10 1.10 1.10 gro.

Crown 1 in. Nails, P. gro. \$1.50

Nippers, See Pliers and Nippers.

Nuts—

Cold Punched: Off list.

Mfrs. or U. S. Standard.

Square, plain, \$4.50

Hexagon, plain, \$4.60

Square, C. T. & R., \$4.70

Hexagon, C. T. & R., \$5.00

Hot Pressed:

Mfrs., U. S. or Nar. Gauge Stan'd.

Square Blank, \$4.80

Hexagon Blank, \$5.00

Square Tapped, \$4.60

Hexagon Tapped, \$4.80

Oakum—

Best or Government, lb. 6½c

Navy, lb. 6½c

U. S. Navy, lb. 5½c

Plumber's Spur Oakum, 3½c

In carload lots, 1¢ lb. off f.o.b. New York.

Oil Tanks— See Tanks, Oill.

Oilers—

Brass and Copper, 65@65@10c

Tin or Steel, 70c@10@75c

Zinc, 75@10c

Maltese, Hammers' Improved: No. 1, \$9.00; No. 2, \$4; No. 3, \$4.40 per doz. 50c

Maltese, Hammers' Old Pattern, same list, 50@10c

And I F. & F. & F. Trading Co., 50@10c

Spring Bottom Cans, 70c@70@10c

Railroad Oilers etc., 60@80@10c

Openers— Can—

French, doz. 35c

Iron handle, doz. 25@27c

Sprague, iron Hdl., per doz. 36@40c

Sardine Scissors, doz. \$1.15@3.00

Marvel, per doz. \$1.25

National, 50c

Stowell's, per doz. 35@45c

Tip Top, per doz. 0.75

Egg—

Nickel Plate, per doz. \$2.25

Silver Plate, per doz. \$3.00

Packing—

Asbestos Packing, Wick and Rope, 1 lb. @15½c lb.

Rubber—

Sheet, C. I., 8@13c

Sheet, C. O. S., 9@13c

Sheet, C. B. S., 10@14c

Sheet, Pure Gum, 50@0.70c

Sh. et. Red, 35@14c

Jenkins' Standard, 1 lb. 80c, 25@25@5c

Miscellaneous—

American Packing, 7@10c lb.

Cotton Packing, 15@16c lb.

Italian Packing, 15@16c lb.

Jute, 3½@4 c. lb.

Russia Packing, 7@16c lb.

Common Lipped:

No. 1 2 3 4 5

Per doz. \$0.95 1.05 1.15 1.30 1.65

Roasting and Baking—

Regal, S. & Co., P. doz. Nos. 5-\$4.50;

10 \$5.25; 20 \$5.75; 30 \$6.25.

Simplex, P. doz.:

No. 4 50 60 60 140 150 160

\$2.75 3.25 3.75 3.00 3.25 4.00

Pans— Dripping—

Standard List, 80@25@60@10c

Fry—

Common Lipped:

No. 1 2 3 4 5

Per doz. \$0.95 1.05 1.15 1.30 1.65

Paper— Building Paper—

Asbestos, 1 lb.

Building Felt, 23c

Mill Board, sheet, 10x40 inches 3½c

Mill Board, roll, thicker than 1½

inch, 3½c

Mill Board, roll, 1-16 in. thick and less, 3½c

Plates—

Regal, S. & Co., P. doz. \$4.50;

Self-Sealing Pie Plates (S. & Co.), P. doz. \$3.00

Pliers and Nippers—

Button Pliers, 75@75@10c

Gas Burner, per doz. 5 in., \$1.15@

\$1.20; 6 in., \$1.35@\$1.45

Gas Pipe, 7 8 10 12-in.

\$1.75 \$2.00 \$2.75 \$3.75

Pliers and Nippers—

Bernard's:

Parallel, Pliers, 95c

Paragon, Pliers, 50@5@6@5

Lodi Pliers, 50@5@

Elm City Fence Pliers, 35c

Rosin Sized Sheathing: Per roll

Light wt., 25 lbs. to roll, \$0.35@0.4

Sliding Shutter—	
Reading list.....	.70@10@75%
R. & E. 1 st.....	.34@5%
Sargent's list.....	.50@10%
Shells—Shells, Empty—	
Bra's Shells, Empty:	
First quality, all gauges.....	.60@5%
Climax, Club, Rival, 10 and 12 gauge.....	.65@5%
Paper Shell, Empty:	
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge.....	.25@5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, New Victor, Repeat r, Yellow Rival, 10, 12, 15 and 20 gauge.....	.30@5%
Climax Union, League, New Rival 10 and 12 gauge.....	.25@5%
Climax, Union, League, New Rival, 14, 16 and 20 gauge (\$7.50 list).....	.30@5%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....	.33@5%
Robin Hood, Low Brass.....	.20@10%
Robin Hood, High Brass.....	.30@10%
Shells, Loaded—	
Loaded with Black Powder.....	.40@5%
Loaded with Smokeless Powder, medium grade.....	.40@5%
Loaded with Smokeless Powder, high grade.....	.40@10@10%
Robin Hood, Low Brass.....	.50@5%
Robin Hood, High Brass.....	.50@10@10%
Shoes Horse, Mule, &c.—	
F. o. b., Pittsburgh:	
Iron.....	per keg \$3.85
Steel.....	per keg \$3.60
Burden's, all sizes, per keg.....	\$3.90
Shot—	
Drop, up to B, 25-lb. bag.....	\$1.35
Drop, B and larger, per 25-lb. bag \$1.00	
Buck, 25-lb. bag.....	\$1.00
Chilled, 25-lb. bag.....	\$1.00
Dust Shot, 25-lb. bag.....	\$1.10
Shovels and Spades—	
Association List, Nov. 15, 1902.....	.40@5%
Sieves and Sifters—	
Hunter's Imitation, gro. \$11.00@11.50	
Buffalo Metallic Blued, S. S. & Co., gr. 14@16.....	16x18
\$12.90	18x20
\$13.50	\$15.00
National Mfg. Co.:	
Victor.....	per gro. \$12.00
Surprise.....	per gro. \$11.00
No Name.....	per gro. \$11.00
Shaker (Barler's Pat.) Flour Sifters, per doz. \$2.00.....	.30@5%
Sieves, Tin Rim—	
Per dozen.	
Mesh 1/8 16 18 20	
Black full size .81 20 1.25 1.50 1.75	
Pla ed, full size .81 30 1.35 1.50 1.65	
Black, scant.....	.50@5% 1.00 1.05
Sieves, Wooden Rim—	
Nested, 10, 11 and 12 Inch.	
Mes 18, Nested, doz.....	.60@5@0.75
Mes 20, Nested, doz.....	.75@.85
Mes 24, Nested, doz.....	.90@1.00
Sinks—	
Cast Iron—	
Standard list.....	.60@10@10%
NOTE.—There is not entire uniformity lists used by jobbers.	
Skeins Wagon—	
Cast Iron.....	.70@10@10%
Malleable Iron.....	.40@10@10%
Steel.....	.40@10@10%
Slates, School—	
Factory Shipments.	
"D" Slates.....	.45%
Noiseless Slates.....	.60@4 tens @5%
Wire Bound.....	.45%
Slat Cutters—See Cutters.	
Slicers, Vegetable—	
Sterling No. 10, \$2.00.....	.83@5%
Snaps, Harness—	
German.....	.40@10@10%
Cover'd Mfg. Co.:	
Derby.....	.30@5@2%
High Grade.....	.45@5%
Jockey.....	.30@10@1%
Trojan.....	.45@5%
Yankee, Roller.....	.30@5@2@2%
Cover'd's Saddlery Works:	
Crown.....	.60@5%
German.....	.50@5%
Model.....	.60@5%
Triumph.....	.60@5%
Oneida Community:	
Solid Steel.....	.60@5@5%
Solid Silver.....	.60@5@5%
Sargent's Patent Guarded.....	.60@5@10%
Snares—	
Seyche.....	.50@5@10%
Snips, Tinner's—See Shears.	
Spoons and Forks—	
Silver Plated—	
Good Quality.....	.50@10@60@10@5%
Cheap.....	.40@10@10@10%
International Silver Co.:	
1847 Rogers Bros. and; Rogers & Hamilton.	.40@10@10%
Rogers & bro., William Rogers' Eagle Brand.....	.50@10@10%
Anch'r. Rogers Brand.....	.40@10@10%
Wm. Rogers & Son.....	.60@10@10%
Simeon L. & Geo. Rogers Co.:	
Silver Plated Flat Ware.....	.60@5%
No. 17 Silver Plated Ware.....	.60@10@10%
Sliding Shutter—	
Reading list.....	.70@10@60@10@5%
R. & E. 1 st.....	.34@5@5%
Sargent's list.....	.50@10@10%
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<b	

Ware Hollow-**Cast Iron, Hollow-**

Stove Hollow Ware:	
Ground.....	60¢
Underground.....	65¢
White Enamelled Ware:	
Marlin Kettles.....	70¢
Covered Ware:	
Tinned and Turned.....	50¢
Enamelled.....	50¢
See also Pots Glue.	

Enamelled—

Agate Nickel Steel Ware, list Nov. 1, '01	50¢ 10%
Iron Clad Ware.....	70¢ 10%
Lava, Enamelled.....	40¢ 10%
Never Break Enamelled.....	50¢

Tea Kettles—

Galvanized Tea Kettles:	
Inch.....	6 7 8 9
Each.....	50¢ 60¢

Steel Hollow Ware.

Avery Spiders & Griddles.....	65¢ 65¢ 55¢
Avery Kettles.....	60¢
P-reclaimed.....	50¢ 55¢ 50¢ 10%

Never Break Spiders and Griddles..... 65¢ 55¢

Never Break Kettles..... 60¢

Solid Steel Spiders & Griddles..... 65¢ 55¢

Solid Steel Kettles..... 60¢

WARMERS, FOOT—

PLC Mfg. Co., Soapstone..... 40¢ 40¢ 10%

Washboards—

Solid Zinc.....	9¢ dos
Crescent, family size, bent frame.....	85¢
Ged Star, family size, stationary protector.....	33¢
Double Zinc Surface:	
Saginaw Globe, family size, stationary protector.....	82¢ 65¢
Cable Globe, family size, stationary protector.....	82¢ 90¢
Single Zinc Surface:	
Salad, family size, open back perforated.....	82¢ 40¢

Saginaw Globe, protector, family size, ventilated back.....	\$2.25
Brass Surface:	
Brass King, Single Surface, open back.....	\$3.00
Nickel Plate Surface:	
No. 1001 Nickel Plate, Single Surface	\$3.00

Washers—**Leather, Axle—**

Solid.....	.55¢ 10¢ 10@ .55¢ 10¢ 10¢
Patent.....	.85¢ 10¢ 10@ .85¢ 10¢ 10¢

Coil: $\frac{3}{8}$ 1 $\frac{1}{4}$ $\frac{3}{4}$ Inch.

9¢ 10¢ 11¢ 12¢ per 100

Iron or Steel—

Size bolt	6-12 9¢ 3¢ 9¢ 3¢
Washers	8¢ 1.40 5.50 4.9¢ 4.00 3.8¢

In lots less than one keg add 1¢ per lb., 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots. per lb..... 19¢ 20¢

Wedges—

Oil Finish..... lb. 2.90@3.10¢

Weights—**Hitching—**

Covert's Saddlery Works..... 60¢ 10%

Sash—

Per ton, f.o.b. factory:

Eastern District..... \$25.00

Western, Central and Southern Districts..... \$25.00

Wheels, Well—

5-in. 81.6 @ 1.4 : 10-in., 9.00@9.5¢ 15¢

12-in., 82.75@3.65 : 14-in., 84.00@4.25

Wire and Wire Goods—

Bright and Annealed:

6-9 Mesh, Galv. (8c. list) sq. ft. 75¢@7.1¢ 12¢

10 to 18..... 73¢@10@7.1¢@10@8¢

19 to 26..... 75¢@12¢@12.5¢@10@7.1¢@8¢

27 to 36..... 75¢@10@7.1¢@8¢@2.2¢

Galvanized:

6 to 18..... 70@7.0¢@5¢

19 to 26..... 73¢@6.5¢@7.2¢@6.1¢@10¢

27 to 36..... 73¢@10@7.2¢@10¢@5¢

Coppered:

6 to 9..... 70¢@5@7.0¢@10¢@10¢

10 to 18..... 70¢@10@7.0¢@10¢@8¢

19 to 26..... 75¢@7.5¢@7.5¢@10¢@8¢

27 to 36..... 75¢@10@7.5¢@10¢@6¢

Tinned:

6 to 12..... 75@7.5¢@7.5¢

13 to 18..... 72¢@6¢@7.5¢

19 to 26..... 70¢@5@7.0¢@5¢@5¢

27 to 36..... 70¢@7.0¢@7.0¢@5¢

Annealed Wire on Spools..... 70@7.0¢@5¢

Brass and Copper Wire on Spools..... 60@6.0¢@5¢

Brass, list Feb. 26, '96..... 25¢

Copper, list Feb. 26, '96..... 15¢

Cast Steel Wire..... 50¢

Steel Wire..... \$6.00 to 2¢, 40¢

Wire Clothes Line, see Lines.

Wire Picture Cord, see Cord.

Bright Wire Goods—

List April 1, 1901..... 85¢@10¢@10¢@9¢@8¢

Wire Cloth and Netting—

Galvanized Wire Netting..... 80¢@10@9¢@7.5¢

Painted Screen Cloth per 100 ft..... \$1.10@1.15

Light Hardware Grade:

2-3 Mesh, Plain (8c. list) sq. ft. 19¢@2¢

2-3 Mesh, Galv. (8c. list) sq. ft. 2.2¢@2.2¢

Wire, Barb—See Trade Report.

Wrenches—

Agricultural..... 75¢@5@7.5¢@10¢@5¢

Baxter Pat'n S Wrenches..... 70¢@5@7.0¢@10¢@10¢

Dron Forged S..... 45@1.5¢@1.5¢

Acme..... 60@1.0¢@1.0¢

Alligator..... 70¢

Alligator Pattern..... 70¢

Bull Dog..... 70¢

Bemis & Call's:

Adjustable S..... 35¢@5¢

Adjustable S Pipe..... 40¢

Brigg's Pattern..... 30¢@10¢

Combination Black..... 40¢@5¢

Combination Bright..... 40¢

Cylinder or Gas Pipe..... 55¢

Extra Heavy..... 45¢

Merrick's Pattern..... 50¢

No. 3 Pipe, Bright..... 55¢

Boar-iman's..... 35¢

Coes' genuine..... 40¢@10¢@5¢@5¢

Coes' Mechanic..... 40¢@10¢@10¢@5¢@5¢

Domine's Engineer..... 40¢@10¢

Dudley Auto..... 50¢@5@10¢@10¢

Eldin..... 50¢@5@10¢@10¢

Eldin Wrenches..... 40¢

Elgin Monkey Wrench Pipe Jaws..... 35¢

Gem Pocket..... 90¢

Hercules..... 70¢

W. & P. Machinery..... 50¢@10¢

Case lots..... 50¢@10¢

Less than case lots..... 50¢@5¢

Improved Pipe (W. & P.)..... 40¢

Solid Handles, P. S. & W..... 50¢@5¢@5¢

Sullivan..... 65¢

Triumph..... 60¢@10¢

Vulcan Chain..... 50¢

Fruit Jar—

Perfection Fruit Jar Wrenches..... 18¢

Triumph Fruit Can Wrenches..... 19¢

Cap Wrenches..... 20¢

Triumph Fruit Jar Holders, Pdoz..... 4.00

Triumph Fruit Jar Holders, Pdoz..... 4.00

Price, \$0.00

Wrought Goods—

Staples, Hooks, etc., list March 17 '92..... 50¢@10¢@5¢

Yokes Neck—

Covert Saddlery Works, Trimmed..... 70¢

Covert Saddlery Works, Neck Yoke Centers..... 70¢

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers & Freighters, list net

Zinc—

Sheet..... lb. 6.4¢@6.5¢

PAINTS, OILS AND COLORS.—Wholesale Prices.**White Lead, Zinc, &c.**

Lead, English White, in Oil..... 3¢@ 9¢

Lead, American White, in Oil..... 3¢@ 9¢

Lots of 500 lb. or over..... 3¢@ 6¢

Lots less than 500 lb. 3¢@ 6¢

Litharge, bbls. ½ bbls. and kegs:

Lots 500 lb. or over..... 6¢

Lots less than 500 lb. 6¢

Chalk, in bulk..... 3¢@ 10¢

Chalk, in bbls. 3¢@ 10¢

China Clay, English..... 12.00@17.5¢

Cobalt, Oxide..... 2.24@2.5¢

Whiting, Common..... 1.00@1.5¢

Whiting, Gilders..... 1.00@1.5¢

Whiting, extra Gilders..... 1.00@1.5¢

Brown, Vandyke, Burnt and Powdered..... 8¢@ 12¢

Sienna, Italian, Burnt and Powdered..... 1.00@ 2¢

Sienna, American, Burnt and Powdered..... 1.00@ 2¢

Talc, French..... 1.00@ 1.25@ 1.50

Talc, American..... 1.00@ 1.10

Terra Alba, French, 10 lb. 95¢@ 1.00

Terra Alba, English..... 95¢@ 1.00

Terra Alba, American No. 1..... 65¢@ 85¢

Terra Alba, American No. 2..... 45¢@ 50¢

Umber, Turkey, Bkt. & Pow. 2¢@ 3¢@ 3¢

Umber, Turkey, Raw & Powd. 2¢@ 3¢@ 3¢

Umber, Bkt. Amer. 1.00@ 2¢

Yellow, Chrome..... 10¢@ 25¢

Vermilion, American Lead..... 10¢@ 40¢

Vermilion, Quicksilver, bulk. 10¢@ 70¢

Vermilion, Quicksilver, bags..... 10¢@ 70¢

Vermilion, English, Import..... 80¢@ 95¢

Vermilion, Chinese..... 8.00@ 12.00

Colors In Oil.

Black, Lampblack..... 12@ 14¢

Blue, Chinese..... 30@ 60¢

Blue, Prussia..... 32@ 63¢

Blue, Ultramarine..... 13@ 16¢

Brown, Spanish..... 14¢@ 16¢

Brown, Vandyke, Amer..... 14¢@ 2¢

Brown, Vandyke, Foreign..... 14¢@ 3¢

Carmine, No. 40..... 8¢@ 25¢@ 27.5¢

Green, Chrome, ordinary..... 3@ 6¢

Cabinet..... 11¢@ 16¢

Extra White..... 18@ 23¢

French..... 12@ 14¢

Irish..... 13¢@ 18¢

Low Grade..... 9@ 12¢

Medium White..... 14¢@ 16¢

Mineral Oils.

Black, 30 gravity, 25@30 cold test.....

Black, 30 gravity, 15 cold test..... 13¢@ 13¢

Black, Summer..... 11@ 12¢

Cylinder, light filtered..... 15¢@ 19¢

Cylinder, dark filtered..... 15¢@ 18¢

Paraffine, 90-97 gravity..... 13¢@ 14¢

Paraffine, 903 gravity..... 12¢@ 13¢

Paraffine, 883 gravity..... 10¢@ 11¢

Paraffine, red, No. 1..... 13¢@ 14¢

In small lots ½¢ advance.

THE IRON AGE*The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.***ISSUED EVERY THURSDAY MORNING.****Subscription, postpaid,**

CURRENT METAL PRICES.

MARCH 11, 1903.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

**IRON AND STEEL—
Bar Iron from Store—**

Refined Iron:

To 12 $\frac{1}{2}$ in. round and square.....	\$ 2.15@2.20¢
1 $\frac{1}{2}$ to 4 in. x 3 $\frac{1}{4}$ to 1 in.....	\$ 2.20@2.30¢
1 $\frac{1}{2}$ to 4 in. x 1 $\frac{1}{4}$ to 5-16.....	\$ 2.40@2.50¢
Rods— $\frac{1}{4}$ and 11-16 round and square. # D 2.40@2.50¢	
Angles:	Cts per lb.
3 in. x 3 $\frac{1}{4}$ in. and larger.....	2.35¢
3 in. x 3-16 in. and 3 $\frac{1}{4}$ in.	2.60¢
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x 3 $\frac{1}{4}$ in. and thicker.....	2.40¢
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x 3-16 in. and thicker.....	2.35¢
1 to 1 $\frac{1}{4}$ in. x 3-16 in.	2.40¢
1 to 1 $\frac{1}{4}$ in. x 3 $\frac{1}{4}$ in.	2.45¢
7 $\frac{1}{2}$ x 3 $\frac{1}{4}$ in.	2.60¢
7 $\frac{1}{2}$ x 3 $\frac{1}{4}$ in.	2.60¢
6 $\frac{1}{2}$ x 3 $\frac{1}{4}$ in.	2.60¢
12 x 3-32 in.	4.10¢
Tees:	
1 in.	2.85¢
1 $\frac{1}{4}$ in.	2.75¢
1 $\frac{1}{2}$ in. and larger.....	2.65¢
Beams:	3.50@3.00¢
Channels, 3 in. and larger.....	2.50@3.00¢
Bands—1 $\frac{1}{2}$ to 6 x 3-16 to No. 8.....	# D 2.50¢
"Burden's Best" Iron, base price.....	# D 3.30¢
Burden's "H. B. & S." Iron, base price.....	# D 3.10¢
"Ulster".....	# D 3.15¢
Norway Bars.....	3.75@4.25¢
Norway Shapes.....	4.00@4.50¢

Merchant Steel from Store—

Bessemer Machinery.....	2.10 to 2.20¢
Tee Calk, Tire and Sleigh Shoe.....	2.30@3.00¢
Best Cast Steel, base price in small lots.....	7¢

Soft Steel Sheets—

1 $\frac{1}{2}$ inch.....	2.50¢
8-16 inch.....	2.60¢
No. 8.....	2.60¢
No. 10.....	2.60¢
No. 12.....	2.70¢
No. 14.....	2.80¢
No. 16.....	2.90¢
No. 18.....	3.10¢
No. 20.....	3.10¢
No. 22.....	3.20¢

Sheet Iron from Store.

Black.

ne Pass, C. R. Soft Steel. Cleaned.	R. G.
Nos. 14 to 16.....	# D 2.85¢
Nos. 18 to 21.....	3.05¢
Nos. 22 to 24.....	3.25¢
Nos. 25 and 26.....	3.35¢
No. 27.....	3.45¢
No. 28.....	3.55¢

Russia, Planished, &c.

Genuine Russia, according to assort-ment.....	# D 113@14¢
Patent Planished.....	# D A. 10¢; B. 9¢, net.

Galvanized.

Nos. 14 to 16.....	# D. 3.00@3.05¢
Nos. 18 to 20.....	# D. 3.25@3.30¢
Nos. 22 to 24.....	3.55@3.60¢
No. 26.....	3.80@3.85¢
No. 27.....	4.10@4.25¢
No. 28.....	4.40@4.45¢
No. 30.....	5.55@5.60¢
No. 30 and lighter, 30 inches wide, 25¢ higher.	

Foreign Steel from Store—

Best Cast.....	# D 15¢
Extra Cast.....	# D 15¢ @ 20
Swaged, Cast.....	# D 16¢
Best Drawn Shear.....	# D 15¢
Blister, 1st quality.....	# D 13¢
German Steel, Best.....	# D 10¢
2d quality.....	# D 9¢
3d quality.....	# D 8¢
Sheet Cast Steel, 1st quality.....	# D 15¢
2d quality.....	# D 14¢
3d quality.....	# D 13¢
R. Muschet's "Special".....	# D 75¢
" " " " Annealed.....	# D 75¢
" " " " Titanic.....	# D 19¢
Hobson's Choice XX Extra Best.....	# D 35¢
Jessop Self Hardening.....	# D 45¢
Seaman's "Nelson" Steel.....	# D 40¢
Hobson's "Soho" Special Self-Hardening.....	# D 43¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.	Per lb.
Banca, Pigs.....	30 $\frac{1}{2}$ @3.00¢
Straits, Pigs.....	30 $\frac{1}{2}$ @3.00¢
Straits in Bars.....	31 $\frac{1}{2}$ @3.15¢

Tin Plates—

American Charcoal Plates.

Calland Grade:	
IC. 14 x 20.....	.86.25
IX. 14 x 20.....	.75.75
Melyn Grade:	
IC. 14 x 20.....	.57.75
IX. 14 x 20.....	.72.25
Allaway Grade:	
IC. 14 x 20.....	.52.25
IX. 14 x 20.....	.63.35

American Coke Plates—Bessemer—

IC. 14 x 20.....	.108.2
IX. 14 x 20.....	.85.70@5.75

American Terne Plates—

IC. 20 x 28.....	.88.75@9.00
IX. 20 x 28.....	.80.75@11.00

Copper—

DUTY: Pig, Bar and Ingot and Old Copper free.	
Manufactured, 2 $\frac{1}{2}$ ¢ lb.	

Ingots—

Lake.....	13 $\frac{1}{2}$ @11.1
Casting.....	13 $\frac{1}{2}$ @13.5

Sheet and Bolt—									
February 2, 1902.									
Prices, in cents per pound.									
Sheet 30 x 60.									
Net.									
Common High Brass. in.									
Wider than and including									
28									
in. 28 30 32 34 36 38 40									
To No. 20, inclusive.....									
39 42 46 50 55 60 65 *									
Nos. 21, 22, 23 and 24.....									
40 43 47 51 56 61 68									
Nos. 25 and 26.....									
41 44 48 52 57 63 71									
Nos. 27 and 28.....									
42 45 49 53 58 65 75									

Common High Brass. in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	28	30	32	34	36	38	40	42	44
in. 28 30 32 34 36 38 40									
To No. 20, inclusive.....	39	42	46	50	55	60	65	*	*
Nos. 21, 22, 23 and 24.....	40	43	47	51	56	61	68		
Nos. 25 and 26.....	41	44	48	52	57	63	71		
Nos. 27 and 28.....	42	45	49	53	58	65	75		

* Special prices not less than 80 cents.

Add 1¢ per lb. additional for each number thinner than Nos. 29 to 38 inclusive. Discount from List.

35¢

Wire in Coils. List February 26, 1902.

Brown & Sharpe's gauge the standard.	Com. high brass.	Low brass and copper
All Nos. to No. 10, inclusive.....	\$0.23	\$0.27
Above No. 10 to No. 16.....	23 $\frac{1}{2}$ 27 $\frac{1}{2}$	28 $\frac{1}{2}$
No. 17 and No. 20.....	24	29
No. 19 and No. 20.....	25	30
No. 21.....	26	30
No. 22.....	27	31
No. 23.....	28	32
No. 24.....	29	34
No. 25.....	30	35
No. 26.....	31	36
No. 27.....	32	37
No. 28.....	33	38
No. 29.....	34	39
No. 30.....	35	40
No. 31.....	36	41
No. 32.....	37	42
No. 33.....	38	43
No. 34.....	39	44
No. 35.....	40	45
No. 36.....	41	46
No. 37.....	42	47
No. 38.....	43	48
No. 39.....	44	49
No. 40.....	45	50
No. 41.....	46	51
No. 42.....	47	52